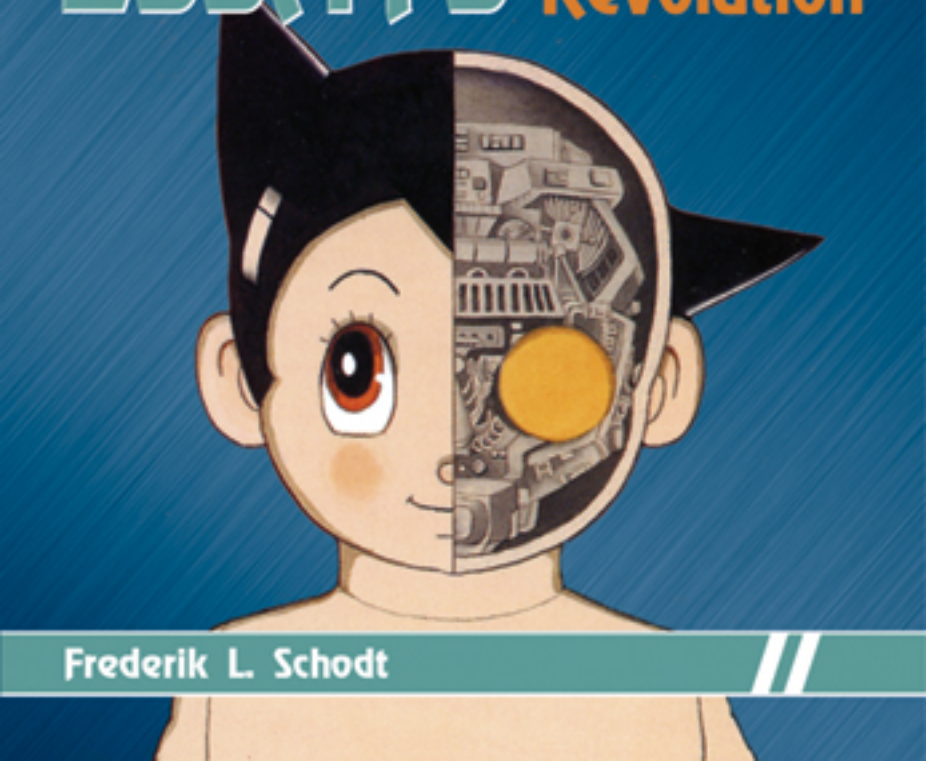
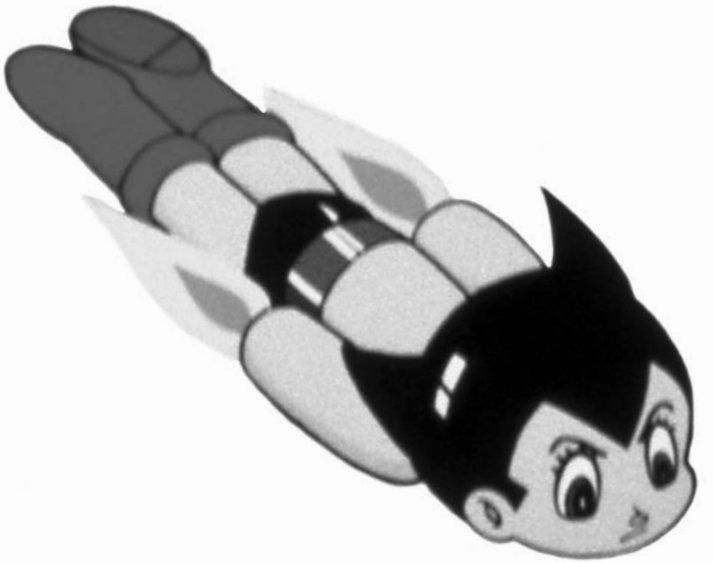
The Astro Boy Essays

Osamu Tezuka, Mighty Atom, and the Manga/Anime Revolution



Frederik L. Schodt

The ASTRO BOY ESSAYS



The ASTRO BOY ESSAYS

Osamu Tezuka, Mighty Atom, and the Manga/Anime Revolution

Frederik L. Schodt

Stone Bridge Press • Berkeley, California

Published by
Stone Bridge Press
P.O. Box 8208
Berkeley, CA 94707
TEL 510-524-8732 • sbp@stonebridge.com • www.stonebridge.com

All images were supplied by the author and are copyrighted by their respective rightsholders. Credits and copyright notices accompany their images throughout.

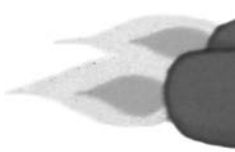
Astro Boy images in the front matter and on chapter-opening pages are used by permission of Tezuka Productions. Front cover Astro Boy image is used by permission of Tezuka Productions.

Text © 2007 Frederik L. Schodt.

Cover and book design by Linda Ronan.

All rights reserved.

No part of this book may be reproduced in any form without permission from the publisher.



Printed in the United States of America.

2011 2010 2009 2008 2007 10 9 8 7 6 5 4 3 2 1

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA
Schodt, Frederik L., 1950–
The Astro Boy essays : Osamu Tezuka, Mighty Atom, and the manga-anime revolution / Frederik L. Schodt.
p. cm.
Includes bibliographical references and index.
ISBN 978-1-933330-54-9 (pbk.)
1. Tezuka, Osamu, 1928–1989—Criticism and interpretation. 2. Comic books, strips, etc.—Japan—History and criticism. 3. Animated films—Japan—History and criticism. I. Title.
NC1764.5.J32T4937 2007
741.5'952--dc22
2007017227

This book is dedicated to
Osamu Tezuka (1928–89)

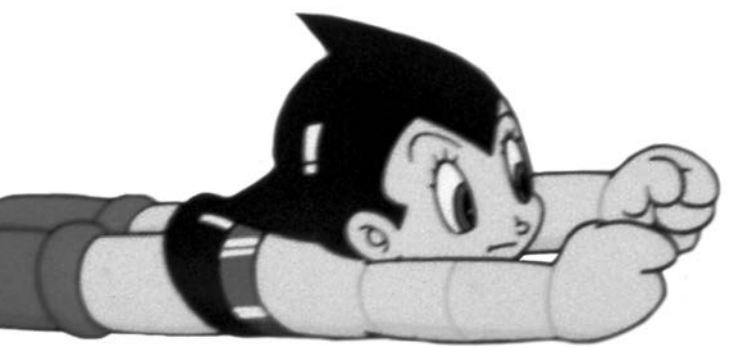


Table of Contents

Introduction *vii*

1 **A National Icon** 3

2 **How "Mighty Atom" Came to Be** 16

3 **Designing a World** 34

4 **Mighty Atom, TV Star 55**

5 **Go, Go, GO Astro Boy!! 76**

6 **An Interface between Man and Robot 98**

7 **A Medley of Messages 119**

8 **A Complicated Relationship 145**

Afterword 167

Appendix A: Japanese and English Manga Titles 177

Appendix B: Japanese and English Animation Episode Titles 185

Notes 197

Bibliography 204

Index 212

Introduction

The death of Osamu Tezuka on February 9, 1989, at the age of sixty, sent shock waves throughout Japan, especially among those raised in the postwar period on his manga and animation. Japan's much beloved and aged Shōwa emperor had passed away the previous month, but the emotion surrounding Tezuka's death seemed greater and resulted in an outpouring of not only grief, but endless media retrospectives and eulogies. On February 10, the day after Tezuka's death, Japan's prestigious national newspaper, the *Asahi*, ran a prominent editorial titled "Mighty Atom's Message," urging younger artists to pick up the torch that Tezuka had dropped and to maintain the values symbolized by his most popular work. It noted that Japanese seemed to love comics far more than in other countries, and that foreigners often found this strange. After rhetorically asking why, it answered its own question:

> It is because in other countries they did not have Osamu Tezuka. The postwar comics and animation culture of

> Japan would never have happened without him. He was the creator of both story-based manga and television anime, and the influence of his attractive and androgynous boy character, Atom, with his long eyelashes, is easy to detect, not only in boys' manga, but also in the protagonists of the now oh-so-popular girls' manga.[1]

For most of his life Osamu Tezuka was largely ignored outside of Japan. It is only recently, with the Godzilla-like global rise of Japanese popular culture—and especially with the new overseas popularity of manga and anime—that his name has begun to slowly percolate into any sort of mainstream English consciousness. Tezuka's animated TV series, *Mighty Atom*—known as *Astro Boy* outside of Japan—achieved considerable popularity in the mid-sixties in North America and temporarily opened the gates for other Japanese TV-animation series, but Tezuka himself received little exposure. In the late 1990s and at the beginning of the new millennium, some of Tezuka's works began appearing in translation in English, but it is safe to say that most people outside of the manga-fan orbit have still never heard of them or of him, even today. There are, as of this writing, no books in the English world specifically on Tezuka, yet in Japan there are scores of books on him. In fact, the Japanese regard Tezuka one of the greatest people of the twentieth century, up there along with John F. Kennedy, Mahatma Gandhi, and the Beatles, and he is sometimes compared in the media with Leonardo da Vinci. There are many reasons for this chasmic difference in perception, but the biggest is the high status comics and animation enjoy in Japan and the low status they have until recently had in North American culture.

During his over-forty-year career, Tezuka created hundreds of stories and thousands of characters. Which raises the question: Why write a book focusing on *Astro Boy/Mighty Atom* and Tezuka, and not Tezuka and his entire canon? The answer

to the first part is simple: *Mighty Atom* is Tezuka's best-known work, and it is the work that helped create the framework for the modern Japanese manga and anime industries. The answer to the second part is more complex and involves both a confession and a digression to explain how I came to write this book.

I did not grow up reading *Mighty Atom* manga or watching *Astro Boy* animation, and only came to know Tezuka's most famous work much later in life. I first went to Japan in the fall of 1965, at the age of fifteen. At that time, the first *Mighty Atom* television series was still being broadcast on the Fuji TV channel, and while I did watch television, it was not a show that particularly sticks in my memory. I could not yet understand Japanese, and it was a series designed for much younger children, so even if I had been a fan it would not have been very "cool" for me to admit it to my friends. But in addition to the TV series, I do recall seeing Mighty Atom–themed toys in stores, and especially Atom masks at temple festivals, so I was very aware of the popularity of the character. My real exposure to *Mighty Atom* came much later in life, when I was old enough to admit enjoying the stories and also old enough to appreciate what Tezuka had accomplished with them. In fact, I came to know Atom best after first knowing Tezuka's other, more adult works and after knowing Tezuka himself.

I began reading manga seriously around 1970, when I was attending a Japanese university in Tokyo and intensively studying the language. I lived in a dormitory my first year there, and I was astounded to see the huge weekly manga magazines that my roommates and other friends were reading (usually when they were supposed to be cracking their textbooks). At that time, manga were not the mass medium that they are today in Japan, but they had become a badge of pride for many university students, an important part of youth culture the way rock and roll

was in the West. I began reading manga to find out what they were all about, and I quickly became hooked, especially when a friend named Shūichi Okada (later to become a JAL airline pilot) lent me his treasured volumes of Osamu Tezuka's cosmic epic, *Hi no tori*, or *Phoenix*, and implied that reading them would unlock many of the mysteries of life.

At about the same time, I began to dream of someday translating manga, or perhaps even writing something about them and introducing this interesting phenomenon to people outside of Japan. Years later, around the beginning of 1977, I met some like-minded friends, and four of us (two Americans and two Japanese) formed a short-lived group called Dadakai to translate and hopefully publish Japanese manga in English. We were young, naive, and idealistic, and one of the first manga that we decided to attempt to translate was Osamu Tezuka's multi-volume *Phoenix*. We approached Tezuka's company directly and, after explaining what we wanted to do, were granted permission. The *Phoenix* series would not be officially published until nearly thirty years later, but for me, and for Jared Cook, the other American in Dadakai, this was the beginning of a relationship with Tezuka that continued until his death, which included interpreting for him when he visited North America and helping him and his company on a variety of projects.

Tezuka was one of the few people I have known in my life whom I could describe as a true genius, and his influence on my way of thinking about things was profound. He was around twenty years older than me and a true intellectual—a man of vast knowledge and endless curiosity about the world and about life. And he was a one-man dream factory—always, always working, thinking up new ideas for manga and animation projects, writing, and drawing. For a Japanese of his era, he had far more contact with foreigners than most, but along with Jared, I am probably one of the few with whom he ever had serious

discussions in his own language. This experience was interesting to him and fascinating for me, but at the time I frankly did not fully realize what a privilege it was. I do now.

Japanese postage stamp memorializing Osamu Tezuka and Mighty Atom. Issued on January 28, 1997, it is one of the first postage stamps ever to feature a manga artist or manga work.

Through Tezuka I was exposed to the Mighty Atom and Astro Boy character in a very basic way, but it took me a long time to get around to reading all the manga stories, as there seemed to be too many, and they seemed too childish and even too old-fashioned for my tastes at the time. On top of that, in those days I rarely watched television (and came by a VCR late in life), so I had little opportunity to watch the original animation series either. I frankly preferred Tezuka's newer work with a stronger narrative—the long-arc "story manga" that he pioneered and at which he excelled. But I loved the character design of Mighty Atom, and over the years the top of the refrigerator in my home began to accumulate more and more Mighty Atom figurines and paraphernalia.

In 1980 Tezuka decided to remake his original 1963 *Mighty Atom* TV series, to make it in color with a bigger budget and newer technology. Hoping to replicate his success at exporting the 1963 series to North America and other countries, he asked me to view videos of many episodes and write a report, advising him on what would and would not work from the perspective of a non-Japanese. I did my best, and although I never told him

in so many words, for a variety of reasons the new series did not impress me as much as his older work.

In 1983 I wrote a book introducing Japanese manga to English-speaking people. Titled *Manga! Manga! The World of Japanese Comics*, it had a translation of a short part of *Phoenix* and an introduction to manga history and Tezuka, and for that I did a cursory reading of most of the *Mighty Atom* manga series. In 1987, I also wrote *Inside the Robot Kingdom: Japan, Mechatronics and the Coming Robotopia*, about Japan's fascination with robots, and for that I again wrote briefly about *Mighty Atom* and formally interviewed Tezuka. Then, in 1990, I worked on the first published translation of Tezuka's 1953 work, *Tsumi to batsu* (*Crime and Punishment*) based on the novel by Fyodor Dostoevsky, and I became particularly fascinated by Tezuka's early work, when he was just developing his new narrative style.

In 1993, four years after Tezuka's death, I was drawn back into the *Mighty Atom* stories when a Japanese publisher asked me to write a commentary for a new anthology edition. In 1996, when I published another book on Japanese manga, *Dreamland Japan: Writings on Modern Manga*, I dedicated a large section of the book to Tezuka and his work, including *Mighty Atom*.

By 2002 the market for manga and animation in North America had begun to really explode. *Mighty Atom* paraphernalia covered not only the top of my refrigerator, but most of the rest of my apartment as well. When I was asked by the American publisher Dark Horse Comics if I would be interested in translating Tezuka's entire *Mighty Atom* manga series, I jumped at the chance. But this was no easy undertaking, since the whole series consists of twenty-three volumes of paperbacks, or around 5,000 pages. And literary translation, even of comic books, involves far more than simple reading. It requires a process of total immersion in the story and in the head of the author, in this case for over two years.

Translating what in English is titled the *Astro Boy* series allowed me to view Tezuka in an entirely different light. Tezuka worked on both the manga and animated series for decades and was deeply connected to and identified with the Mighty Atom character until his death in 1989. As a result, the *Mighty Atom* series is a window into the life and character of Osamu Tezuka himself and shows him not just as an artist, but as a man. And since Tezuka was one of the pioneers of modern manga and anime, the story of the *Mighty Atom* series and Tezuka's relationship to it is also a way to understand the development of these new media in Japan.

For years, people have suggested that I write a book about Tezuka, but I have always felt that it would not be possible to do him or readers justice in one volume. This is partly because Tezuka was such a productive and complex individual, and because his career and influence spans so many diverse areas. But it is also because there is such a huge gap in awareness of him between Japan and the English-speaking world. Any single book on Tezuka that tries to catalog his entire life and work by default becomes huge. For non-Japanese, it would also be filled with unfamiliar manga and anime titles, names, and references. In compiling them all, I know that I would feel overwhelmed, and so, I fear, would the readers.

Writing a book about *Astro Boy/Mighty Atom*, on the other hand, is a wonderful way to introduce not only a fascinating manga story and anime series, but also to introduce Osamu Tezuka himself, since he created it over so many years, and since it remains so closely associated with him. In this book, *The Astro Boy Essays*, it is my sincere hope that readers will be able to enjoy learning about not only a fascinating manga and anime character, but also about the fascinating relationship between that character and the artist who created him.

Before concluding, some housekeeping details are in order.

The character and the work known as *Tetsuwan Atomu*, or "Mighty Atom," in Japan, is known as *Astro Boy* in the English-speaking world. For historical purposes in this book, however, it is necessary to distinguish between the original Japanese work and the English-language version. In marketing *Mighty Atom* today in Japan, the highly awkward and double-jointed *Astro Boy/Tetsuwan Atomu* logo is sometimes used, but for orthographic and aesthetic reasons I have decided that it would not be practical here. For the book title I have used *The Astro Boy Essays*, and I earnestly pray that purists will forgive any confusion that may arise and kindly keep their arrows in their quivers until they have read whole the book.

There is great debate, even in Japan, over what should be included in Tezuka's *Mighty Atom* manga canon, especially over which edition of his manga collections is most authoritative. For this book, the main source in discussing the manga series is the twenty-three volume 1999–2000 Akita Shoten Sunday Comics edition of *Tetsuwan Atomu*. When referring to specific episodes in the Atom manga and anime series, I have used my own English translations, but an appendix in the back of the book shows the original Japanese titles, as well as the American *Astro Boy* titles, for both the manga and the anime.

On a minor note, I should point out that long vowels in Japanese are represented in the text with macrons, except for common place names. The letter *n* has been used to romanize the Japanese syllabic *n*, except where official spellings of company names such as *Asahi shimbun* require the letter *m*. All dollar values in this book refer to U.S. dollars. Also, Japanese names are presented in Western order of family name last. While this may be heretical in the academic world, for a general audience it is the most practical order, and I thus beg indulgence of purists. In addition, I have tried to use Japanese character names rather than the creatively translated English names with which

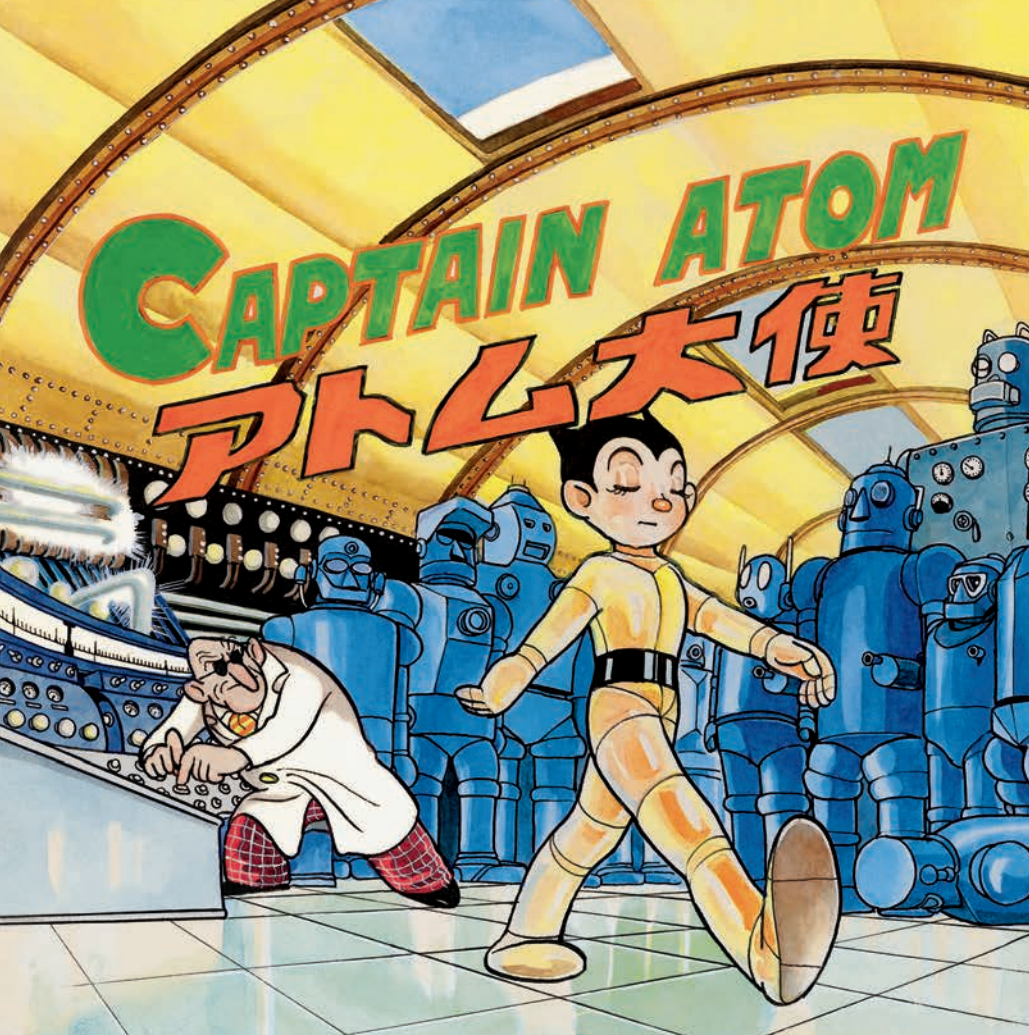
many American fans of the 1963 *Astro Boy* animation series are familiar. I have provided a list of some of these names in the book for reference.

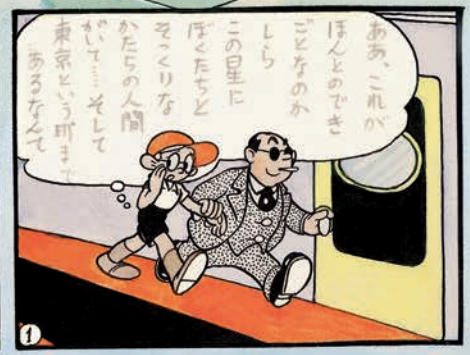
Finally, this book has been in the works for many years and I could not have completed it without the help of many people. For interviews, I would like to thank Shawne Kleckner, Minoru Kotoku, Fred Ladd, Fred Patten, Yusaku Sakamoto, Osamu Tezuka, Yoshiyuki Tomino, and Eiichi Yamamoto. At Tezuka Productions, Takayuki Matsutani, Minoru Kotoku, Haruji Mori, and Yoshihiro Shimizu were unstinting in their support. Hiromasa Horie and Masato Ishiwata were particularly obliging of my need for last minute assistance in scanning rare cover images and retrieving old videos. Satoshi Ito of Mushi Productions, Osamu Kawamura of Matsuzaki Productions, and Takayuki Furuta of fuRo, were extremely helpful in obtaining select images. Chris Warner of Dark Horse Comics and Toren Smith of Studio Proteus helped make it possible to translate Tezuka's *Mighty Atom/Astro Boy* manga series, which in turn helped motivate me to write this book. For agreeing to read my early-stage mangled prose and render sage advice, Jared Cook and Leonard Rifas deserve special mention; Fred Ladd helped greatly by checking Chapter 5. A tip of the hat to Keiko Tokioka for video dubbing, to Ken Ogawa for supplying me with valuable information and books, to Raymond Larrett for visual advice, to Yuki Ishimatsu for research advice, and to Linda Pettibone, Anne Christensen, and Norm and Marcia and Julianna Degelman for assorted Astro Boy paraphernalia. My undying gratitude goes to my dear, dear friends Jō and Nanae Inoue, who over the years never failed to send me relevant newspaper clippings and videos, Jō tragically passing away suddenly just after mailing me a particularly useful batch. At Stone Bridge Press, thanks to the entire staff for help under a tight publishing schedule. For moral support and tolerance of my tardiness, a

Japanese-style bow to old friend and publisher Peter Goodman. For editing, thanks to Nina Wegner. For book design, thanks to Linda Ronan. And thanks, last but not least, to my dear parents for their support, and to my wife and the flame of my heart, Fiammetta Hsu, who not only indulges my Astro Boy fetish, but wholeheartedly endorses it (and also helped in the laborious checking of the book's appendices).

FREDERIK L. SCHODT
San Francisco, California, 2007

CAPTAIN ATOM
アトム大使





© Tezuka Productions

© Tezuka Productions

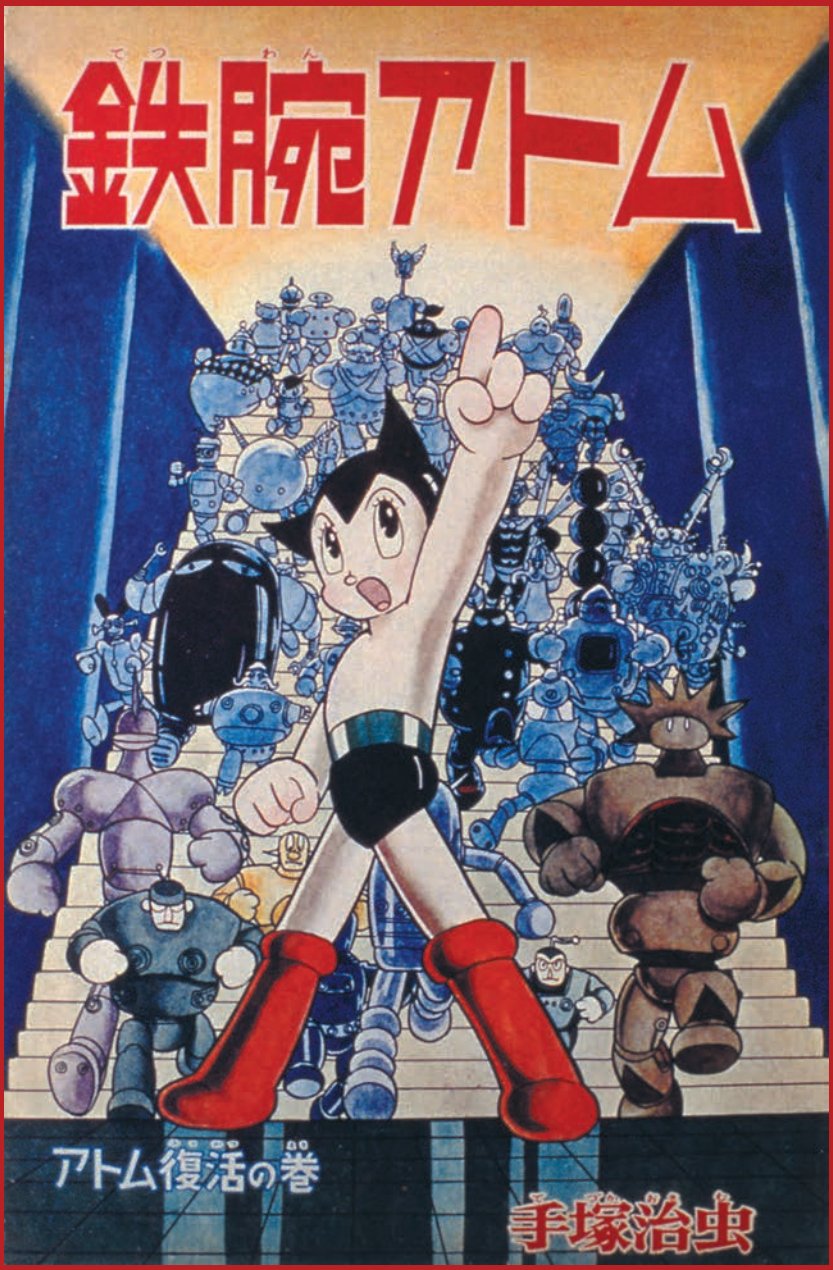
PREVIOUS PAGE: "*Ambassador Atom.*" *Original art for July 1951 issue of* Shōnen.
THIS PAGE: *Frontispiece illustraton for "The Melanin Tribe," part 2, in August 1966 issue of* Shōnen.
FACING PAGE: *Color illustration for "The Melanin Tribe," part 4, in October 1966 issue of* Shōnen.

鉄腕アトム

メラニン一族の巻・4

手塚治虫

© Tezuka Productions



© Tezuka Productions

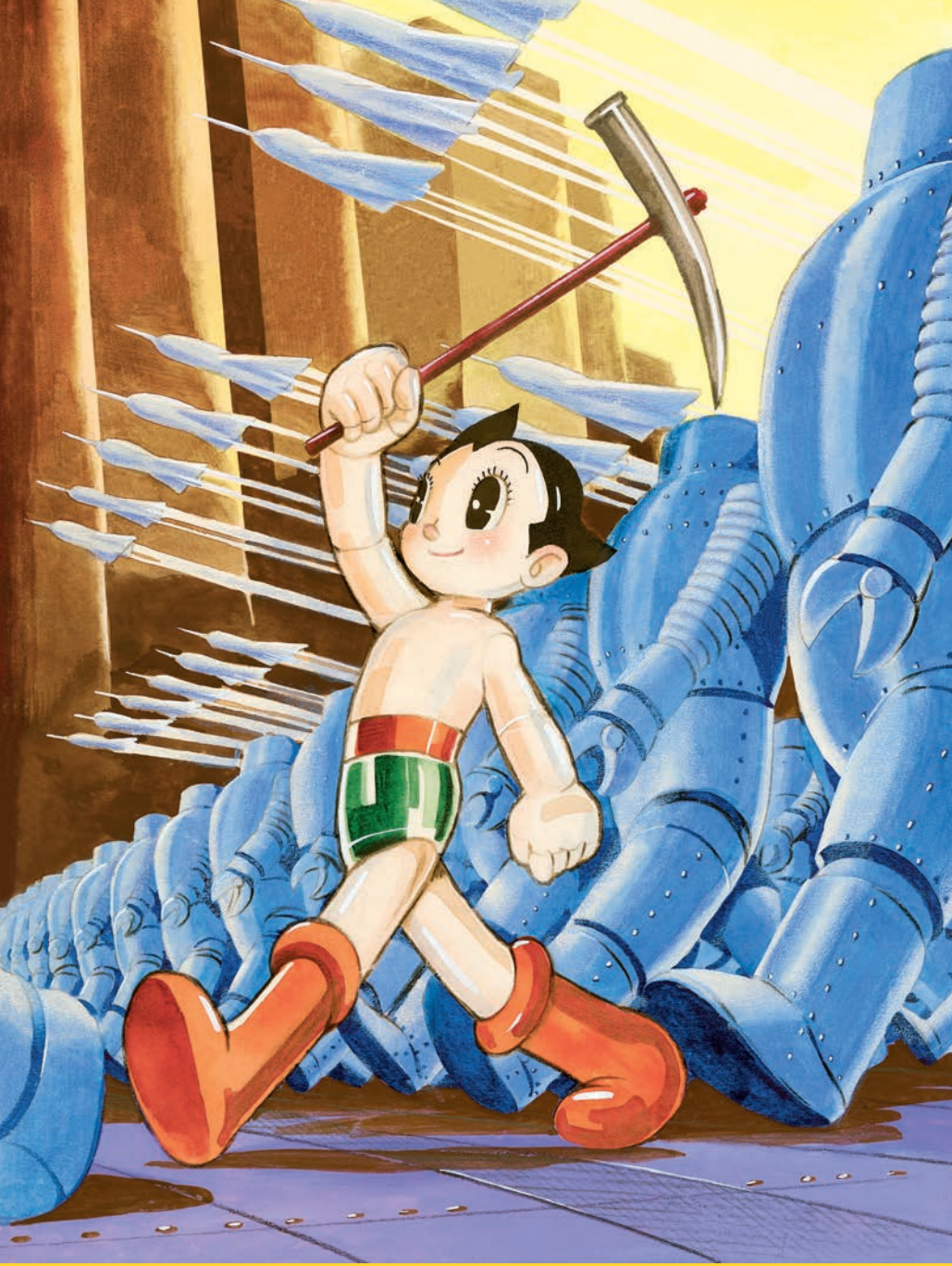
THIS PAGE: *Color illustration for "Mighty Atom Reborn" in May 1966 issue of* Shōnen.
FACING PAGE: *Color illustration for "The Greatest Robot on Earth," part 4, in September 1964 issue of* Shōnen.

© Tezuka Productions

© Tezuka Productions

THIS PAGE: *Color illustration for "Führer ZZZ" in September 1954 issue of* Shōnen *"furoku," or supplement volume.*

FACING PAGE: *Original art work for cover of first paperback volume of* Mighty Atom, *June 1956. Kōbunsha edition.*

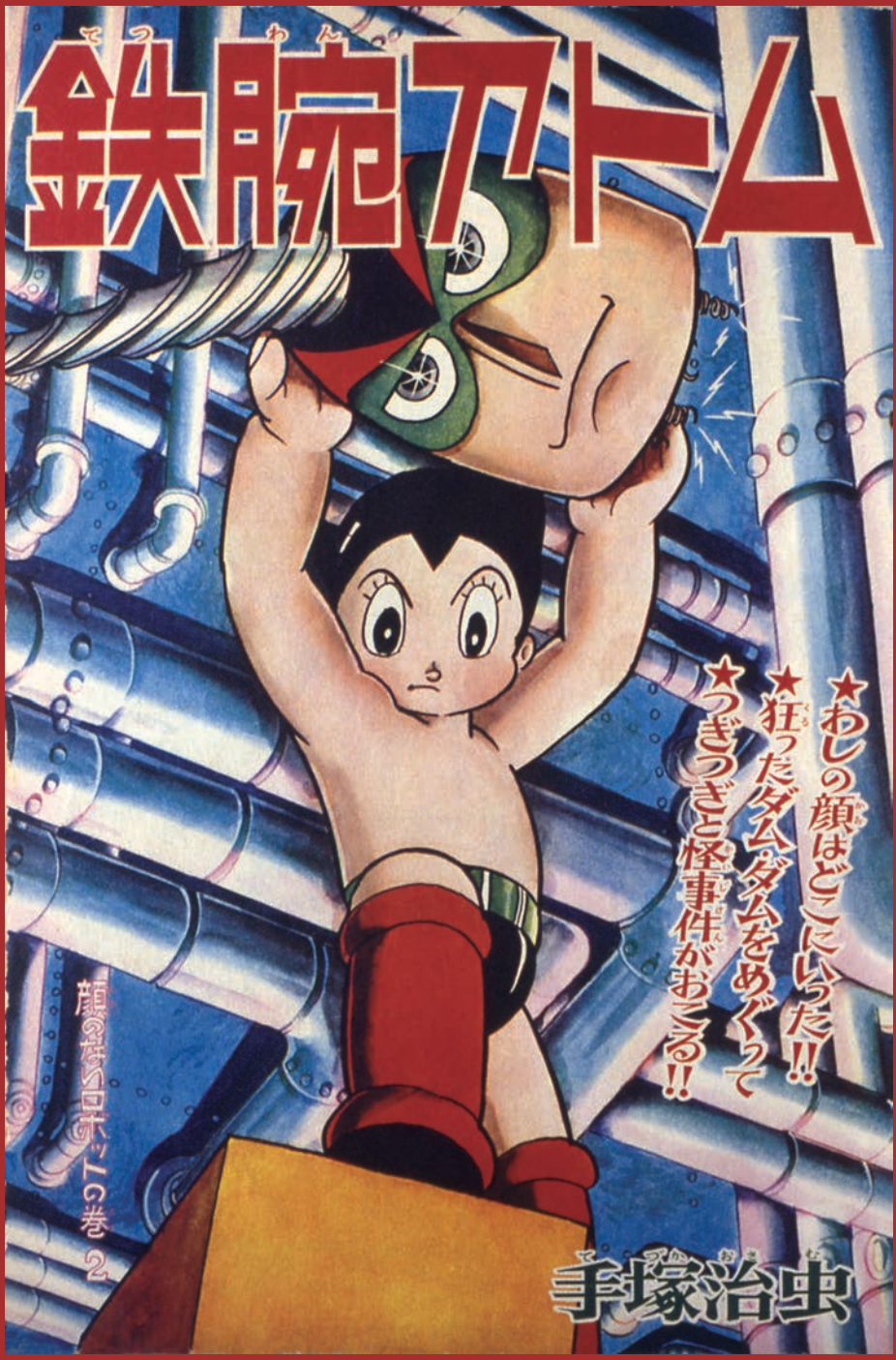


© Tezuka Productions

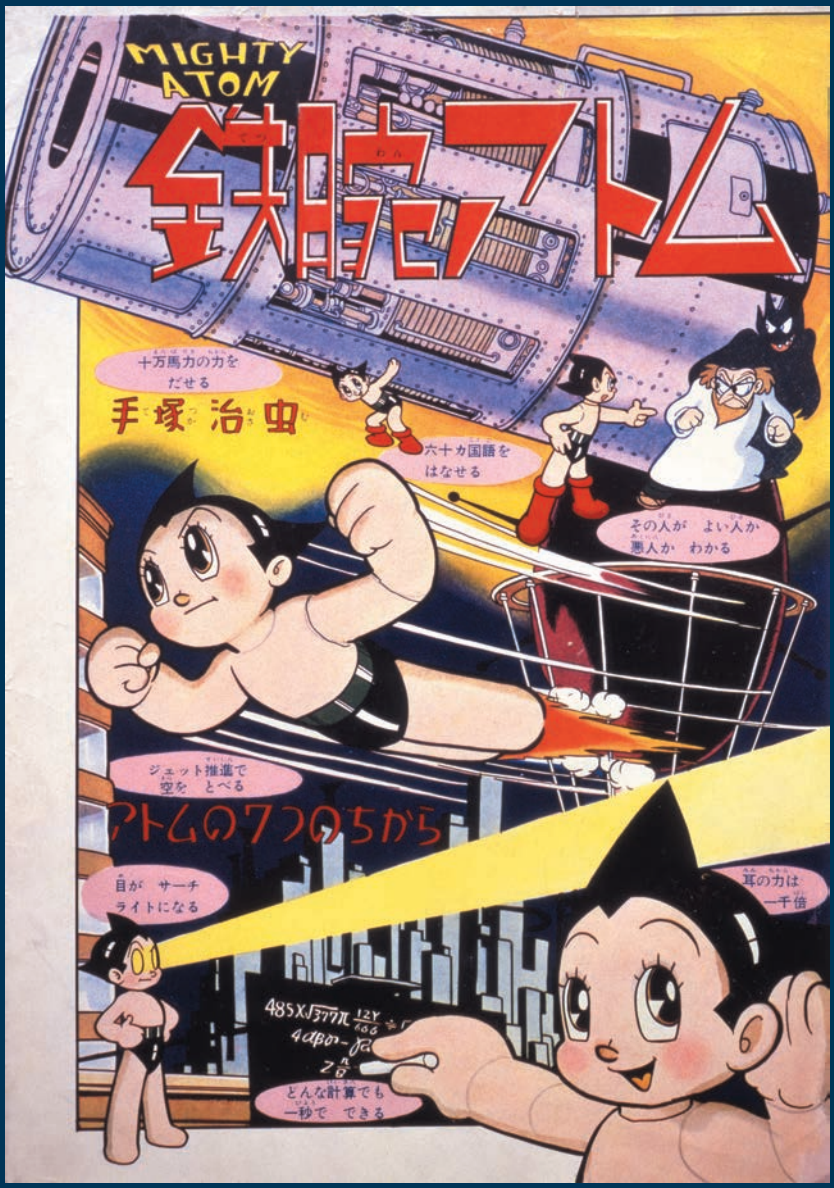
© Tezuka Productions

THIS PAGE: *Color illustration for "The Hot Dog Corps" in August 1961 issue of* Shōnen.

FACING PAGE: *Color illustration for "The Faceless Robot" part 2, in February 1967 issue of* Shōnen *"furoku," or supplement volume.*



© Tezuka Productions



© Tezuka Productions

THIS PAGE: *Color illustration for "Crucifix Island" in April 1958 issue of* Shōnen *showing Atom's seven special powers.*

FACING PAGE: *Cover illustration for "The Test Pilot" in September 1956 issue of the* Shōnen *"furoku," or "supplement volume." Story inside was designed to be viewed in 3D, with special glasses included.*

© Tezuka Productions

© Tezuka Productions

THIS PAGE: *First page of "The Midoro Swamp" part 3, in October 1956 issue of* Shōnen.

FACING PAGE: *First page of "Satellite W47" in October 1955 issue of* Shōnen. *Episode title later changed to "Yellow Horse."*

鉄腕アトム

手塚治虫

地球観測年というのは世界じゅうが力をあわせて、われわれの住むこの地球のくわしい調査をする年である。二〇??年がそれにあたる……

☆いよいよ、人工衛星調査隊出発!!　アトムは学校へもどったが、またまたおきた怪事件!!

© Tezuka Productions

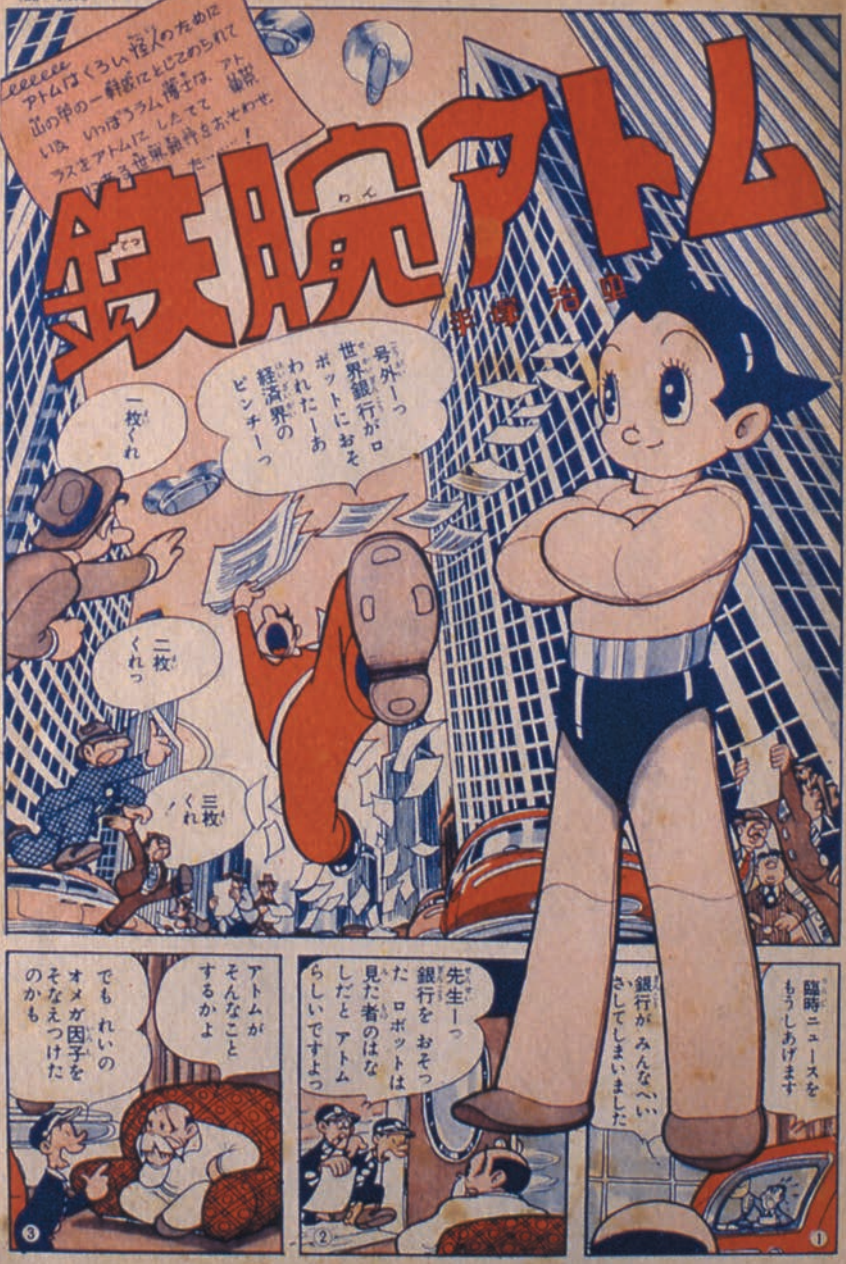
© Tezuka Productions

THIS PAGE: *First page of "The Midoro Swamp" in September 1956 issue of* Shōnen.
FACING PAGE: *First page of "Atlas" in July 1956 issue of* Shōnen.
FOLLOWING PAGE: *First page of "Mad Machine" in August 1958 issue of* Shōnen.

鉄腕アトム

手塚治虫

☆アトムにばけたアトラスをあやつる、ふくしゅうの鬼ラム博士！　アトムがんばれっ！



© Tezuka Productions

© Tezuka Productions

The ASTRO BOY ESSAYS

1 A National Icon

It was April 6, 2003, and I was zipping along an elevated Tokyo expressway on my way to witness the "birth" of Mighty Atom. I wasn't driving but sitting in the back seat of a Toyota Prius hybrid while Takayuki Matsutani, the president of Tezuka Productions, drove. Gasoline-electric hybrid cars had been around for a while in Japan, but they were then still quite new to most Americans, and it was my first ride in one. Osamu Tezuka, the creator of Atom, had passed away fourteen years earlier, yet Tezuka's ghostly image had been licensed to promote Toyota's hybrids when they first appeared in 1997, so it made considerable sense that the top official of his company drove one. That the car had a slightly rounded retro-future design, reminiscent of the sort Tezuka liked to draw in his science-fiction comics, also seemed particularly appropriate. With the *kā-nabi*, or "car navigation" system, displaying a map of the dense, skyscraper-lined city we were slicing through, I felt thoroughly postmodern and ready for the upcoming Mighty Atom event. Had Tezuka been alive, he might have wondered why the car couldn't fly.

My mind was filled with thoughts of Mighty Atom. We had just come from an early-morning viewing of the first broadcast of a brand-new *Mighty Atom* TV series, produced by Sony Pictures and Tezuka Productions. Pitched at both domestic and foreign markets and designed to appeal to old as well as new fans, it had the somewhat awkward English-Japanese compound title of *Astro Boy/Tetsuwan Atomu*. Inaugurated with great fanfare on the Fuji Television network, it also had a production budget said to be several times that of the average anime series, new character designs, and a lavish use of computer graphics. Still, I worried that the series might devolve into a typical action-oriented Japanese robot show, or that the added gloss of design and new technology might drown out the charm of Tezuka's original manga story. I didn't have much time to worry, though, for immediately after the broadcast we had zipped over to the famous Takashimaya department store in the Nihonbashi area of Tokyo, where most of one floor was devoted to an Atom "Perfect Search" exhibit. There, giant statues of characters from the story were on display, as well as a jewel-encrusted Atom figurine, accurate down to the hatch in the middle of his mechanical chest and estimated to be worth over $1 million.

❍ ❍ ❍

In 1951, when Tezuka first created his now-classic *Tetsuwan Atomu*, or "Mighty Atom" character, he never dreamed that it would become such a star. In the manga story, Atom was a highly advanced little boy robot invented, in Pinocchio fashion, by a mad scientist as a surrogate for his dead son. Atom was cute and almost cuddly, and he always helped humans, frequently fighting off assorted monsters and criminals and evil robots. Unlike American superheroes that usually fought for justice, he also fought for the ultimate goal of postwar defeated Japan—peace. To Tezuka's surprise, readers couldn't get enough of Atom, so

he wound up serializing the story in various manga magazines for nearly twenty more years and dabbling with it thereafter into the eighties. In 1963, Tezuka also turned his robot tale into Japan's first animated TV series, which in the same year was exported to the United States and broadcast by NBC under the title of *Astro Boy*. The huge success of Mighty Atom in manga, animation, and merchandise means today that Atom is far more than an ordinary fantasy character; he is a pop-culture icon and the embodiment of the dreams and fantasies of millions of people, both young and old.

Photo © 2003 Frederik L. Schodt

A jewel-encrusted Atom with chest hatch open, showing his heart.

In Tezuka's original story line, Atom was not born in 1951 but over fifty years in the then-distant future. At first Tezuka merely wrote that Atom was born in 2003. Later he indicated that it was April 7, 2013. Not until many years later, when he apparently needed to pin down the birthday of his increasingly famous character, did he (or his editors) combine the two dates and choose April 7, 2003. The exact reasons for this are not entirely clear, but had Tezuka realized how enormously successful and resiliently popular his character would become by 2003, he might well have originally chosen April 6 instead of the seventh, for as it turns out the seventh falls on a Monday, which is a somewhat problematic day to

market anything. It was to maximize publicity on television and in print media that the "birthday" event to which I was headed was being staged on the sixth, a Sunday.

❍ ❍ ❍

In April 2003, the rest of the world was glued to television sets watching the United States Army roll into Iraq, but in Japan, Atom's "birthday" events were almost as big news. Over a year in advance, Tezuka Productions had organized eighty major corporations to promote Atom as part of a giant media-mix "Atom Dream Project." Meiji Seika, one of Japan's leading confectioners, was to make Atom-themed candies, some in a retro 1950s style. Sony Pictures, working with Tezuka Productions, had created a brand-new Atom TV-anime series. And scores of other companies were lined up to produce new Atom-themed toys, books, comics, music, and assorted merchandise. According to a study conducted by Dentsu, Japan's largest advertising agency (and a key member of the project), $5 billion in direct and indirect revenues would be generated over a three-year period. It was a wildly optimistic estimate but widely quoted in the general media and in government publications extolling Japan's new "soft" culture power.[2]

As the sponsors noted in a statement about the Atom Dream Project, it had been nearly fifty years since Tezuka created *Mighty Atom*. Japan's cultures of comics and animation—which Atom both emerged from and helped create—had subsequently developed into something quite unique and won acclaim around the world. Many young people who had grown up with and been influenced by Atom, moreover, had gone on to pursue careers in science; so much so that, for many modern robotics researchers, creating something akin to a real Atom had become a technological goal. While technology might have caused some problems, the statement said, the ideals Atom represented have

become even more important today. The Atom Dream Project may have been put together largely for marketing purposes, but the sponsors, aiming for a high note, stressed that Atom's official birthday of April 7, 2003, should be commemorated to "plant his spirit of 'hopes and dreams for the future' in the minds of children and the adults in charge of our world."[3]

That there was any date at all on which to hook the Atom Dream Project made it fairly easy to promote, especially because of the novelty aspect of a fifty-plus-year-old character's birthday being in the immediate, rapidly approaching future. For months, the prestigious national *Asahi* newspaper had promoted Atom-related events and news as part of a national countdown. It amplified the tension every day, with full-page ads for new products and emerging technologies, using slightly fractured English slogans such as "Astro Boy is a miraculous super robot with the world's best artificial brain and a heart like human's," or "Astro Boy who is pure and tender of heart and has a strong sense of justice, confronts his mighty foes in spite of his small body to aspire to a world robots and humans can be friends." Few Atom fans were immune to this buildup; I even had an Astro Boy digital countdown clock and had spent over a year hoping that it might emit smoke or flash or even explode on April 7 (to my great disappointment, it would simply time out at "0 days, 0 hours, 00 minutes, and 00 seconds").

❍ ❍ ❍

The biggest "pre-birthday event," and the one to which I was headed, was on April 6 at Robodex 2003 in Yokohama, the port city neighboring the Tokyo metropolis. The local media have long referred to Japan as the "Robot Kingdom" because Japan has far more robots at work in its factories than any other nation, and because the Japanese people have a seemingly inexhaustible supply of affection for both real and fantasy automatons.

For years the Japan Robot Association, or JARA, has actively staged industrial robot-related symposiums, trade shows, and exhibitions in Japan. But while the exhibits have been open to the public and crowded with families, the truth of the matter is that today's industrial robots are usually mere mechanical arms attached to a computer; highly utilitarian, they are mainly used on factory floors as glorified machine tools. For children raised on exciting images of friendly androids like Mighty Atom or intelligent warrior robot "suits" like Gundam, traditional robot-industry exhibitions have often been bitterly disappointing.

It was partly to address this problem that the first Robodex exhibition had been organized in 2000. Instead of factories, it focused on the future and on the dreams that people have for robots, rather than their present reality. Instead of industrial robots, it featured those being developed for use in rescue missions, for entertainment, and as "personal" or "partner" robots—the little pet robots that will certainly help us do household chores and keep us company in the near future. When interviewed by the *Asahi* newspaper on March 25, 2003, the so-called "father" of Robodex and then-executive vice president at Sony Corporation, Toshitada Doi (who developed the popular AIBO pet robot), said: "[Personal] robots will become even more incorporated into our lives and more useful than personal computers. They will become a bigger market, and definitely become the first truly new industry of the twenty-first century." A fan of Mighty Atom himself, he noted that the 2003 Robodex schedule had been deliberately adjusted so that a "pre-birthday party" for Atom could be held on the last day of the event.[4]

❍ ❍ ❍

When I arrived at the 2003 Robodex show, the cavernous exhibition hall was already packed with people (newspapers later reported sixty-seven thousand visitors over four days). I had

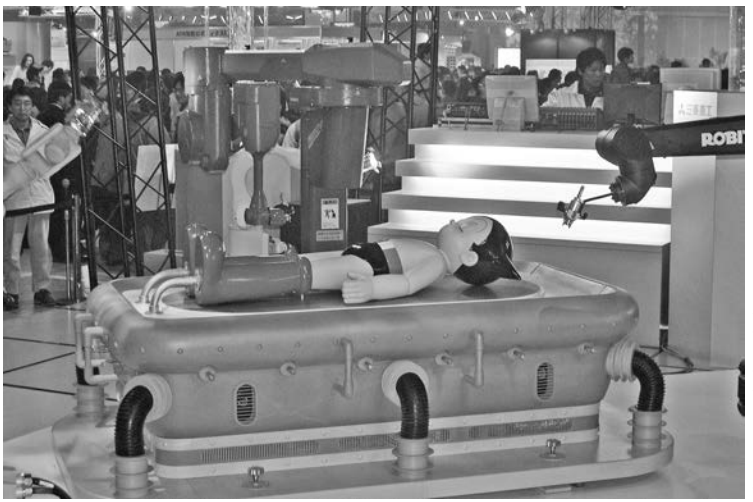


Photo © 2003 Frederik L. Schodt

Mighty Atom lying in state at Robodex 2003, attended by industrial robots.

been to many industrial-robot trade fairs before in the course of writing a book on Japanese robotics, but Robodex stands out as one that actually achieved its goal. With humanoid robots that ranged from simple toy-like creations to complex experiments in locomotion and balance, the show entertained and created a feeling of excitement about new technology. It was, in fact, the perfect showcase for one of the great strengths of Japan: the humanizing of complex technology. Many of Japan's top manufacturers, especially Sony and Honda, were represented with large booths, as were various universities and research labs. If it seemed an all-Japanese affair, it was probably because outside of Japan almost no firms or labs are engaged in serious humanoid-robot research and development. The only American firms I noted were Kentucky Fried Chicken and Pizza Hut, running the fast-food booths in the back.

Mighty Atom, noted Toshidata Doi in the show's program guide, had become a virtual synonym for robots in Japan, so

it was appropriate that the show highlight his birthday. Sure enough, in the middle of the hall, in a space sponsored by Mitsubishi Heavy Industries and labeled an "Atom Dream Factory," a life-size mockup of Atom lay in repose on what looked like a futuristic operating table. It was an attempt to replicate the scene in the original manga where Dr. Tenma (the director of the Ministry of Science's Department of Precision Machinery) had mobilized the "cream of Japanese technology" to develop Atom and had brought him to life in Frankenstein-ish fashion with a spectacular infusion of high voltage. In the Mitsubishi re-creation of this event, instead of Dr. Tenma, three or four Mitsubishi industrial robots were preprogrammed to act as futuristic mechanical surgeons. Every thirty minutes they hovered and swayed over Atom's outstretched form while smoke generators belched mist into the air, the hatch in Atom's chest opened, and he raised an arm and sat up part way.

The Mitsubishi display was merely a visual appetizer at Robodex 2003. There were, of course, a few intellectually heavy events, including a symposium with discussions on the potential future market for personal robots. In a panel titled "Brains, Biology, and Robots," the participants included some of Japan's top roboticists. Mitsuo Kawato, the head of the Computational Neuroscience Lab at Japan's prestigious ATR institute (an industry-government-academia consortium designed to further technologies such as robots) attracted considerable attention with a serious proposal for a grand "Atom Project." With the United States Apollo program as a model, this would be a thirty-year national project to create a robot with the intellectual and physical capabilities of a five-year-old human—a "Mighty Atom" of sorts, without the super powers. It might not even be possible, Kawato admitted, but like the Apollo program it could lead to a wide variety of technological spin-offs and help revitalize Japanese industry and economy. Compared to the

Apollo program the budget proposed seemed like a real bargain—only ¥50 billion per year, or a total of approximately $15 billion.[5]

Of course, most people wanted to see real robots, not listen to techno-laden discussions about them. And for this the true focal point of the exhibits was a "Mega Stage," where the real robots were put through their paces. Here, also at regular intervals, humanoids made by companies such as Honda and Sony emerged from the wings and wowed audiences by walking, running, even climbing stairs in a highly naturalistic fashion. They required considerable setup and were expensive and highly limited in function, but they were—at least for 2003—astoundingly humanlike and a showcase of modern Japanese technology.

Photo © 2003 Frederik L. Schodt

Honda's Asimo humanoid navigates the stairs at Robodex 2003.

Around noon, the main "Atom" event took place. The "operating table" with Atom on it was wheeled to the main stage by white-coated "technicians." Then Macoto, the forty-two-year-old son of the late Osamu Tezuka, made a grand appearance dressed in an oversized cream-colored impresario suit, his hair died a dramatic blond. Playing the part of a postmodern Dr. Tenma at the birth of his creation, he stood by the prone and still lifeless robot, while more smoke billowed and dramatic announcements boomed over the cavernous hall's

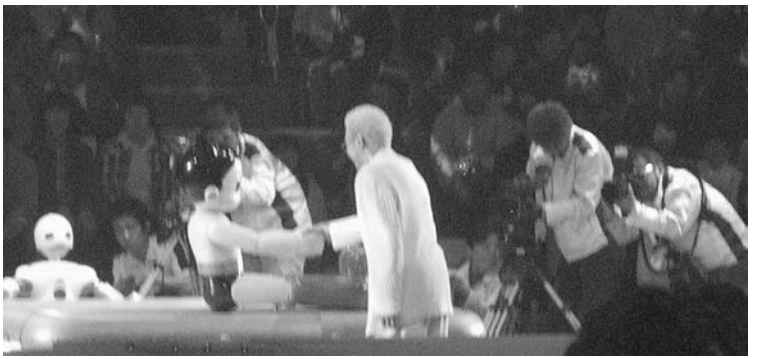


Photo © 2003 Frederik L. Schodt

Macoto Tezuka and Mighty Atom at Robodex 2003.

loudspeakers. Atom then opened his eyes, slowly sat up, and extended his hand, whereupon Macoto grasped it as if to welcome the little android to the real world. And at that instant the jam-packed hall exploded with the hard-rock sound of "True Blue," the opening song from the new animation series, performed by ZONE, a popular and cute all-girl band.

In truth, the Atom robot displayed at Robodex was technologically primitive, a mere mannequin with a few simple servo motors. While other robots at the convention, such as Honda's Asimo or Sony's SDR 4XII were developed with millions of dollars and capable of walking, running, and even dancing in sync, Atom was firmly tethered to his table and capable only of opening his eyes, raising an arm, and sitting up part way. Since, in the original manga story line, Atom had a "100,000 horsepower" atomic engine, an advanced computer brain, searchlight eyes, machine guns in his fanny, and jets in his hands and feet that enabled him to fly through the air, it might have been more appropriate for him to at least get off his operating table and walk around the room, but in this case he was only a symbol of a larger cultural phenomenon. And with the crush of mass media present recording the event, the

mannequin-Atom's actions were good enough, for the next day most major papers splashed photos of Macoto grasping the robot's upraised hand.

❍ ❍ ❍

There were plenty of other events for the media to report that weekend. On April 6 there was a large Atom-themed costume parade in the Takadanobaba area of Tokyo, where, in the original story line, the Ministry of Science was located and—not insignificantly—Tezuka Productions is in real life headquartered today. There was also a fireworks show in the modernistic Odaiba area, which abuts Tokyo Bay. And Atom-themed events were also held in other areas of Japan too, in April and later, including a giant flower display made in his image from one hundred thousand tulips in the town of Tantō, in Hyōgo prefecture.

A variety of special events were also planned on Atom's actual "birthday," the hard-to-market April 7. At the headquarters of Tokyo's Shinjuku Ward, in front of a crowd of journalists, Hiroko Nakayama, the ward mayor, presented a human masquerading as Atom with a special plaque inscribed with the following words: "We hereby appoint you Shinjuku's emissary of the future, in hopes that you will grow with our children and lead our citizens into the future of our dreams." In the afternoon, at another special ceremony in Niiza city, in greater Tokyo (where Tezuka Productions has its animation studio), the same Atom impersonator was made an honorary resident of the city.

❍ ❍ ❍

In retrospect, it is clear that the Atom Dream Project did not achieve many of the financial goals it had set for itself. There appeared to be a glut of Atom-related merchandise on the market. The new animated series did not meet the ratings expectations of the industry, either. A long-planned and loudly trumpeted

Photo © 2003 Frederik L. Schodt

Citizen Mighty Atom, Takayuki Matsutani (president of Tezuka Productions), and Hiroko Nakayama (the mayor of Shinjuku Ward).

Hollywood theatrical feature was subsequently put on hold again (and later cancelled). And when all was said and done, it was not entirely clear that the baby-boomer generation's deep and nostalgic attachment to Atom could be transmitted to younger generations, at least in the same way.

Still, Atom had already been firmly implanted in the Japanese consciousness long before the marketing hoopla of 2003, and afterwards his profile only rose. For decades, children at school sports events in Japan have exercised to the tune of the original *Mighty Atom* anime theme song. At Tokyo's busy Takadanobaba station, trains today leave and arrive every few minutes to the same melody. And Atom has always been very much in the public eye due to continued merchandising of Atom manga books and anime, as well as myriad Atom-themed toys. In the adult world, since Tezuka's death, Atom's character has been licensed and used to advertise traded securities as well as home security systems.

But one of the most interesting manifestations of Atom's enduring popularity is surely the scores of books written about him or using his name in the title. Some are little more than synopses of the original manga and anime stories. Others analyze the meaning of the stories in minute detail. Yet others compare

Atom with real-world robotics research. And some use Atom merely as a vehicle to talk about other subjects. One with the title (in translation) of "Does Atom Dream of Electric Sheep?" is a series of "science essays." Another with Mighty Atom in the title compares the attempts to build an emotive robot to that of educating autistic children. What is remarkable about most of these publications is that they are almost all targeted not at the young children of the original *Mighty Atom* series' target market, but at adults.

Atom is also often employed metaphorically in Japan today in a completely non-commercial context. On the April 7 "birthday," the main editorial in the *Asahi* newspaper was titled, "We Don't Want to See Atom's Tears," and consisted of a plea that science and technology be used in a way to benefit humankind. The next day, on the eighth, the political cartoon on the same page of the newspaper showed Atom holding George Bush and Saddam Hussein by the scruff of their necks, flying over suffering masses of civilians, and reprimanding the two leaders with the words, "Look! Now, don't you think this was really an 'avoidable war?'"[6]

2 How "Mighty Atom" Came to Be

In Japan, Osamu Tezuka is often referred to as *manga no kamisama*, or the "God of Manga," for his role in popularizing comics. A man with an abnormally fertile imagination and almost superhuman productivity, in his lifetime he is said to have drawn over one hundred and fifty thousand pages of comics and created five hundred different works, populated by over one thousand highly individualistic characters. But of all his characters, the one for which he is most widely known is Mighty Atom.

Atom first appeared in a series titled *Atomu Taishi*, or "Ambassador Atom." It ran in short installments from April 1951 until March 1952 in the monthly boys' magazine, *Shōnen* (Boys), published by Kōbunsha. Yet Atom was hardly the star. He was only one of many characters, and he did not even appear in the story until the July issue. For today's Japanese, accustomed to the long, "cinematic" and narrative manga that Tezuka later helped pioneer (and make the dominant form of manga), "Ambassador Atom" can be painful to read. The convoluted plot seems weighted down by a goulash of characters and ideas that Tezuka

was prone to insert in his stories, and because most episodes consist of only eight or so pages, the pacing is slow. Characters act out scenes inside small rectangular and regular panels, which are arranged on pages in a cramped, constrained fashion with lots of words. Yet for readers at the time, the pages crackled with a new, almost electric energy—an energy generated by Tezuka's wildly imaginative tales that contained verbal and visual gags, slapstick humor, tragedy, and high drama all at once.

In the basic story line of "Ambassador Atom," another planet identical to Earth has blown up, and its native inhabitants—who barely escaped alive in huge space ships—have been forced to wander the cosmos for two thousand years in search of a new home. Except for their large ears (a result of living in weightless conditions), they look exactly like Earth humans, and when they eventually discover our Earth and decide to emigrate to it, they find a parallel world populated with human counterparts. At first the space people and the humans get along fine, but competition for food soon ensues. Meanwhile, Dr. Tenma, the brilliant head of the Ministry of Science in Japan, loses his beloved son Tobio in a traffic accident and creates a highly advanced robot boy to replace him. But when Tenma realizes that the robot boy (Atom) will never grow like a real human child, he becomes somewhat deranged. He develops a special "shrinking" liquid, and in conjunction with a band of secret police that he heads called the "Red Shirt Brigades," he decides to attack the space people with his liquid weapon. Atom, appalled, rebels against his "father" and tries to stop him, but not before the space people have become so enraged that they threaten to wreak havoc on earth with hydrogen bombs (which the United States actually tested shortly after the story ended). Atom eventually saves the day by visiting the space people as a neutral "emissary of peace." He proposes that half of both space people and Earth people move to another planet, either Mars or Venus,

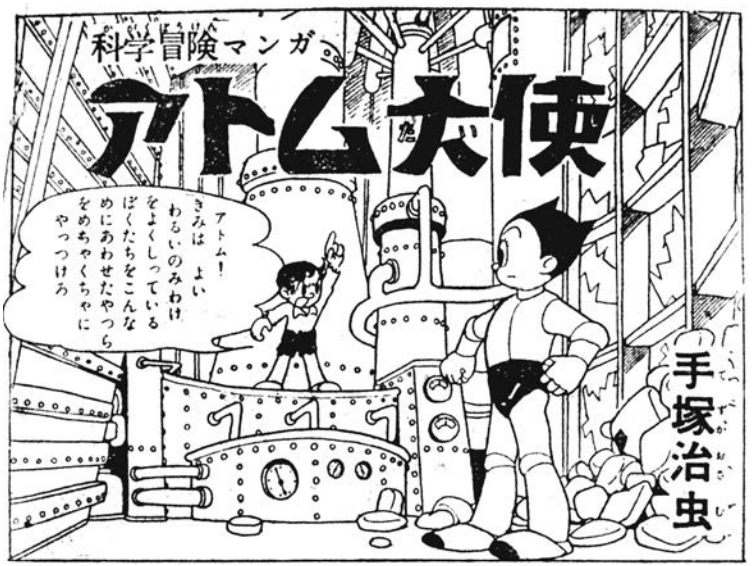
and to prove his sincerity he temporarily leaves his robot head with the space people, winning them over and saving the day.

Ambassador Atom had all the elements of the later *Mighty Atom* stories and most of the main characters, but it lacked in coherence and, as noted earlier, Atom did even not appear until the fourth episode. The cover page of that episode described the series as a "lengthy science manga," and above the title of *Atomu Taishi* there was an English translation that read "Captain Atom" instead of "Ambassador Atom." The reason for this is not entirely clear today, except that in Japanese the words for "ambassador" and "captain"—while written with different characters—are pronounced the same way. In 1951 English was extremely popular and often used in advertising and the media to suggest modernity, but few editors would have known enough English to correct any errors.

❍ ❍ ❍

Before starting his *Ambassador Atom* story, Tezuka had been living in the Kansai area of Japan, west of Tokyo, drawing and writing for local manga publications known as *akahon* (red books). These were manga booklets printed primarily with monochrome ink on rough paper (like today's manga), but with gaudy color covers using lots of red and orange to attract children. *Akahon* were often sold outside regular publishing channels, especially to candy stores, kiosks, and then-popular pay-libraries, and they had a reputation of being "cheap" in both price and quality. The real center of the manga industry, or at least the Mecca for all serious children's artists, was Tokyo, the capital, where mainstream magazines for children were flourishing with rapidly growing national circulations, higher quality, bigger budgets, and status.

At the time, *Shōnen*—published by Kōbunsha, in Tokyo—was one of the most popular boys' monthly magazines, and in



A panel from an early episode of Atomu Taishi *(Ambassador Atom), in the March 1952 issue of* Shōnen *magazine.*

the summer of 1950 its editor-in-chief had asked Tezuka to try creating a one-shot story. Eager to please, Tezuka sent in a proposal for a work he had been mulling over for some time, with a theme related to Japanese mythology. It was rejected as too odd, and he was then asked—in what is usually the dream of budding manga artists—to come up with an idea for a serialized story. After wracking his brains, he proposed a "science fantasy": a work about a futuristic city-state called the "Atom continent." As he recalled much later, he chose the word "Atom" because the Americans were doing nuclear bomb tests, and "everyone was talking about 'atoms' then." Like most Japanese who had just survived World War II—during which Hiroshima and Nagasaki were destroyed by American atom bombs—he abhorred nuclear weapons and fervently hoped that peaceful uses of the

new technology would emerge. He therefore imagined that an "Atom continent" might exist where atomic power was used for peaceful purposes.[7]

This idea was also deemed far too broad and complicated by the editors, so they suggested that Tezuka focus more on human characters. After wracking his brains, he therefore changed his working title from *Atomu tairiku* (Atom Continent) to the similar-sounding *Atomu Taishi* (Ambassador Atom) and resubmitted the idea. "To tell the truth, at the time I had no real idea of what I was doing and no particular structure in mind; it was just a title that occurred to me. After proposing it, I *really* had to come up with something."[8]

Tezuka began creating his story in this haphazard fashion, improvising as he went along, finally introducing a character named Atom in the fourth episode and, apparently on a whim, deciding to make Atom a robot boy. This first version of Atom was a far cry from the version he later became, however, for he still looked very much like a robot, and his body had visible seams and his face had little expression. As Tezuka notes, "At first he was completely doll-like. He had no personality, no feelings, and he acted as a silly robot foil for the other characters in the story. No one could have guessed he would eventually become a warm, humanlike robot with a burning sense of justice!"[9]

Ambassador Atom was not as popular as hoped, the story being, as Tezuka admits, "too complicated, with too many characters." Nonetheless, Tezuka occasionally received up to one hundred fan letters per day and was mightily impressed with the power of mainstream children's magazines to reach readers throughout the nation. The young editor-in-chief of *Shōnen* magazine, thirty-three-year-old Takeshi Kanai, was also undeterred, and he proposed that Tezuka restart the story making Atom the star, since Atom seemed to have been the most pop-

ular character among young readers. When Tezuka protested that it would be difficult to make a true "robot" the star, Kanai reportedly replied, "Well, yes, but make him a robot with a human personality. Then the readers will identify with him, and think of him as a friend. Instead of making him a character that takes off his head and arms for a gag, make him a robot with emotions, who laughs, cries, and gets angry when he senses injustice!" Tezuka thereafter went back to the drawing board and came up with the first episode of what was retitled *Tetsuwan Atomu*, or *Mighty Atom* (*tetsuwan*, usually translated as "mighty," is written with the ideograms for "iron" and "arm"). In the first episode of this newly reworked story, Tezuka attempted to humanize his young robot character by having Dr. Tenma's successor at the Ministry of Science create a robot family for Atom. This idea—of the parents being created *after* the child—proved enormously popular among young readers. And it helped propel the series to permanent success.[10]

❍ ❍ ❍

There was a reason the editors of *Shōnen* wanted Tezuka to draw for them and worked so hard to help him succeed with a manga series. As Kanai would reflect in a documentary made fifty years later, *Shōnen* was a new magazine formed right after the war, and he wanted a new look and direction for it. Unlike today, when Japan sometimes seems awash in huge manga magazines, in the immediate postwar period manga were still a very minor form of entertainment, and in the popular boys' and girls' magazines of the day the vast majority of pages were still devoted to text-based illustrated stories and articles. Serialized manga, while still short and constrained, were nonetheless growing rapidly in popularity, and Kanai sensed that including more manga pages would help his circulation. He also thought that he needed something to help cheer up his young readers.[11]

Japan had lost over two million people in World War II and seen most of its cities destroyed in U.S. bombing raids. In 1951 the Allies still occupied the country, much remained to be reconstructed, and extreme poverty was rampant. To Kanai, including a new manga series in his magazine would therefore also be a way to brighten the lives of his young readers, who ranged from grammar school to junior high school students, and give them "hope and courage." He had seen second-hand American comic books in Tokyo, brought by young American troops in the occupation forces, and taken note of American pulp heroes like Superman and Batman. Perhaps, he thought, it might be possible to get a Japanese artist to create a Japanese-style superhero. With this in mind, he and other editors in the magazine had begun looking for someone appropriate, and, after surveying the marketplace, found themselves riveted by the work of the young Tezuka, still in the town of Takarazuka, near Osaka.

In 1951 Tezuka was hardly a national figure, but he was already becoming a sensation in the world of comics, and the editors of *Shōnen* wanted to avail themselves of his talents. Tezuka had made his professional debut as a cartoonist in 1946 with a short newspaper strip titled *Mā-chan no nikkichō* (Ma-chan's Diary), and when first hired by Kanai he was already on track to revolutionize the world of Japanese comics. In fact, in 1951, he was already drawing a hugely popular series titled *Janguru Taitei* (Jungle Emperor), later known in America as *Kimba the White Lion*, for the rival and confusingly similar-sounding Tokyo boy's monthly, *Manga shōnen*. In addition, he was creating other series for monthly Tokyo children's magazines, such as *Chikyū tonneru* (Earth Tunnel) in *Bōken Ō*; *Pipi-chan* (Little Pipi) in *Omoshiro bukku*; and *Saboten-kun* (Cactus Kid) in *Shōnen gahō*. And if that weren't enough, he was creating multiple non-serialized manga stories for publication as paperbacks, especially for the *akahon*

market. Among his long-format paperbacks were science fiction thrillers such as *Rosuto wārudo* (Lost World, 1948), *Metoroporisu/Daitokai* (Metropolis, 1949), and *Kurubeki sekai* (Next World, 1951). But more than anything else, it was a paperback work titled *Shin takarajima* (New Treasure Island, 1947) created with Shichima Sakai that had caught Kanai's eye.[12]

Courtesy, Tezuka Productions

Osamu Tezuka, the young medical student.

New Treasure Island is a legendary work in Japan today, and original copies are now extremely rare and expensive. It was printed on cheap paper, but at the time it dazzled young readers and inspired numerous other young artists to follow in Tezuka's footsteps, for with it he staked out a brand-new direction for manga. The story was a goulash of *Treasure Island*, *Robinson Crusoe*, and *Tarzan*, but it was a single volume of nearly two hundred pages. And instead of the relatively static format of children's prewar comics, Tezuka used creative layouts to develop an action-packed story filled with "cinematic effects"—of dramatic "camera angles" with pans and close-ups and zooms—so that reading the story seemed like watching a movie. Most shocking to the publishing world of the time, this *akahon* comic book had reportedly sold a then-unheard-of four hundred thousand copies, without the benefit of any publicity.

Tezuka's sales figures certainly impressed Kanai, but so too did his energy, focus, and intelligence. In 1951, while creating a flurry of manga stories, Tezuka was still a registered student at the University of Osaka's medical school. He would graduate in March of that year, commence his internship, and eventually

earn his physician's license. At the time he was still only twenty-three-years old.

❍ ❍ ❍

Tezuka was born on November 3, 1928, in Toyonaka City, in the prefecture of Osaka. He was raised in Takarazuka, a nearby resort town famous for its hot springs, surrounding nature, and—most of all today—its all-women's theater of the same name. His parents were progressive and upper-middle class, with a strong interest in modern arts. His mother loved drama and was a regular attendee at the hugely popular Takarazuka theater, which was (and still is) distinguished by the fact that young women actors play both male and female roles, in a sort of chic mirror-image of the more traditional all-male kabuki theater. His father, although a conventional "salaryman," was a bit of a dandy and an individualist. He not only liked manga at a time when they were not well regarded, but he was also a photography and film buff who, in what was highly unusual in those days, had a home projector with which he showed early American animated shorts and Chaplin films.

Young Osamu thus had a fairly idyllic childhood. He was surrounded by the relatively high-brow arts of literature, film, and theater. Yet he also had access to the most popular pre-war Japanese manga of the day—works such as *Norakuro* (Black Stray), by Suihō Tagawa, and *Bōken Dankichi* (Dankichi the Adventurer), by Keizō Shimada, as well as Tarō Asahi and Noboru Ōshiro's pioneering sci-fi work, *Kasei tanken* (Voyage to Mars), which was published in 1940 and hinted at the cinematic "story-manga" Tezuka would later help develop.

These were all lengthy Japanese manga, but as a boy Tezuka was also a voracious reader of novels, including the then-popular science-fiction works of Jūza Unno. And he read serious literature, too. "What I really devoured as a student,"

he later wrote, "was Russian literature that evoked the smell of the earth, especially the work of Dostoevsky and Tolstoy. . . . *War and Peace*, *Crime and Punishment* were particularly helpful for me as textbooks on storytelling; the latter, in particular, taught me the art of playwriting and helped me in innumerable other ways, too." Tezuka claimed to have read *Crime and Punishment* over and over as a boy, and he was clearly aided by an ability to speed read, later in life boasting that he could digest a three-hundred-page book in ten minutes.[13]

Courtesy, Tezuka Productions

Osamu Tezuka entering Kitano Middle School, 1941, at age thirteen.

Tezuka was surrounded by music, too. He became a gifted piano player, winning awards in college. He played accordion, too. His love of classical music would later influence his work, for he learned to incorporate its rhythms while drawing, and also to incorporate classical themes into his animation productions.

Tezuka was not an athletic child, and from eleven on he wore thick glasses, but he had two hobbies that obsessed him. One was drawing. Later in life he often lamented his lack of formal art training, but he loved to copy cartoons and comic strips that he saw around him. And from the age of nine he was creating his own stories, even creating his own characters, some of which he later used in *Mighty Atom* and other works. His other hobby was collecting insects in the lush hills around Takarazuka and carefully cataloging them. Because of his love of insects—particularly a family of beetles called *osamushi* (Carabidae)—he

began adding the character for "insect" (虫) or "mushi" to his given name, Osamu (治), writing it as (治虫), with a cartoon-like flourish of two dots in the last character to represent "eyes." At the Osamu Tezuka Museum in Takarazuka today, visitors can view—in addition to his early cartooning efforts—illustrations of insects that Tezuka created at age thirteen; they are rendered in full color, in painstaking, photo-like detail. His fascination with insects also carried over later into his comics, to the point where in Japan there is a published 290-page "field guide" to the various insects that appear in his works, including *Mighty Atom*.[14]

Takarazuka may have been an idyllic place to grow up, yet life in the 1940s was not always easy for a precociously intellectual young boy with such a fecund imagination. Japan had emerged from feudalism only about seventy years earlier, rapidly modernizing and developing a parliamentary system and a lively, independent press. But Japan's fledgling democracy was soon undermined by right-wing militarists, and by the late 1930s the country was already embroiled in war on mainland China and rushing toward a disastrous confrontation with the United States in the Pacific. In this environment, a highly nationalistic "group-think" began to take over, and individualistic and critical thinking fell out of favor. Even cartoons were affected. Social and political cartoons for adults, as well as comic strips for children, had once been a major form of entertainment in Japan, but the authorities increasingly regarded them as frivolous and decadent, and at times unpatriotic and dangerous. As early as 1941, Tezuka himself was incurring the displeasure and occasional wrath of his school's military instructors with his drawings.

World War II had a profound effect on all Japanese people, and it had a particularly powerful effect on Tezuka and the stories that he would later create, including *Mighty Atom*.

Tezuka loved all cartoons and comics, especially the American cartoons and animation that were globally dominant at the time. But like most Japanese boys he was also patriotic, and as Japan slid into war he was also exposed to more and more nationalistic influences. In a lengthy but unpublished work he created sometime in 1944–45, titled *Shōri no hi made* (Until the Day of Victory [also the title of a famous film]), he imagined popular American and Japanese comic strip characters at war. It was a lighthearted look by a bright sixteen-year-old boy at a miserable situation showing, among other things, Japan's then-popular "Fuku-chan" character in a bomber destroying American cities and the house of George McManus's popular comic strip characters, Jiggs and Maggie, while Mickey Mouse in turn strafed Osaka. In this early work, Tezuka reveals how he was voraciously absorbing the work of not only prewar Japanese artists, but also American comic strip and animation artists, despite their having been banned.

© Tezuka Productions

Above: An American cartoon character proceeds to load up his bomber, saying, "Jap houses are made of wood and paper, so this oughtta be enough to turn all of Tokyo into ashes!" Below: Japanese observers exclaim, "Look! Incendiary bombs!" From Shōri no hi made *(Until the Day of Victory).*

In reality, by late 1944 Japan was losing the war, and although the government had withheld news of the military's defeats, the entire population had been mobilized in defense of the homeland. Tezuka's father had already been called up by

© 1983 Tezuka Productions

Above: "What the—?" Below: "Can these really be humans? Th-they look like charred dolls . . . !" From Kami no toride *(Paper Fortress), first published September 30, 1970, in* Shōnen King. *Reprinted in Kodansha's* Tezuka Osamu manga zenshū, *vol. 274.*

the army and sent to Manchuria, China, and the Philippines. Sixteen-year-old Osamu missed being drafted because of his young age (and eventual application to medical school), but he was mobilized to work in nearby Osaka, in a factory supplying asbestos slate for the war effort. In utter desperation, civilians at this time were practicing to repel an American invasion with bamboo spears, chanting *Kichikueibei* (Destroy the American and English devils) and *Ichiokunin sōgyokusai* (An honorable death for Japan's one hundred million). But even without an invasion

they were in effect on the front lines too, because American bombers were engaged in indiscriminate attacks on the civilian population. After Tokyo was firebombed in early 1945 and nearly one hundred thousand people killed in two days, Osaka also became a target. At the factory Tezuka risked beatings by secretly reading and drawing manga and sharing them with friends by posting them in the toilet, always fearing discovery. While working there he also directly witnessed the bombings during which much of Osaka city was razed and thousands of civilians killed, and he himself barely escaped with his life. Later, he would describe seeing a sea of fire, like Dante's inferno, with piles of bodies burned to a crisp under a collapsed bridge over a river, where fleeing citizens had tried to take refuge.[15]

On August 15, 1945, the emperor of Japan came on the radio, asking his stunned subjects to "endure the unendurable" by surrendering. All activity in the streets stopped, and many people wept. The young Tezuka who, like everyone else, had believed that Japan would win the war, was shocked. But that same night he visited downtown Osaka on a whim. The city was in ashes, but in the hall of the Hankyū department store—which had somehow been spared—he watched the chandelier lights flicker on, followed by other lights throughout the area. After months of compulsory blackouts, it was an emotional experience and a time to rejoice. The war was over, and during those years he had drawn over two thousand pages of manga and stored them in his closet. He had survived, and now he eagerly awaited the artistic freedom he hoped peace would bring.[16]

With the end of the war, new difficulties appeared. Tezuka also witnessed starvation among a once proud people, and during the wild, unstructured early days of the occupation, he suffered the humiliation and anger of being beaten by a group of drunken American GIs who could not understand his broken English. It was a brutal and direct experience in cultural

misunderstanding that he never forgot. Like all young Japanese of his age, he had also seen how an authoritarian government—his own—had been able to manipulate information and public opinion, and how, after the war, the entire value system of the country was overturned and replaced by a new democratic ideology. It was horrifying, he later said, to realize that "the world could turn 180 degrees, and the government could switch the concept of reality," so that what had been "black" or "white" only days before was suddenly reversed.[17] Instead of retreating into complete cynicism or hatred of the outside world, however, in Tezuka's case the result of all this was revulsion for war, a theme that would permeate nearly all the works he later created. Moreover, he developed a lifelong interest in the complexity of human nature, a deep belief in the need to communicate with other cultures, and a belief in the power of manga and animation to help do so. For Tezuka, cartooning would eventually become a visual type of Esperanto, or international language.

❍ ❍ ❍

In 1951, the timing was perfect for someone with Tezuka's sensibilities and for a story like *Mighty Atom*. To *Shōnen*'s editor, Takeshi Kanai, Tezuka's work seemed very "modern," and it is this very modernity that worked to Tezuka's advantage.

The early postwar years were a revolutionary period for Japanese society, and a type of paradise for ambitious cartoonists—especially those doing any sort of social satire, or looking for inspiration from the tumultuous social changes around them. The Allied forces dismantled Japan's military and held war crimes trials for former leaders, many of whom were executed. Under the direction of General Douglas MacArthur, the Americans promoted sweeping land, business, and social reforms. Instead of emperor-worship, "democracy" became the

slogan of the day. After years of regimentation and draconian censorship there was an explosion in new media and intellectual freedom, and for a period it was even possible to criticize the emperor system. It was, as Tezuka would marvel much later in the 1980s, a true "manga renaissance," a period in many ways even freer than the nominally censorship-free atmosphere of today's Japan, where artists still feel bound by taboos related to ideas of "political correctness" and the almost inexorable momentum of what is now a truly mass medium.[18]

© Tezuka Productions

Portrait of the artist as a young man.

For a short time immediately after the war, however, there were some new, very different constraints. With the collapse of the old regime, nearly everything old was questioned and discredited, especially if it had any association with what was perceived to be "feudalism." During the war, Japanese authorities had censored all publications and banned American influences, but after the war the American authorities banned traditional Japanese martial arts such as judo, karate, and fencing. In the media, stories with samurai and traditional revenge themes, or martial arts themes, or themes that in any way seemed to glorify the old ways were banned, even in manga. Over at *Shōnen*'s rival publication, *Manga shōnen*, the editor-in-chief, Ken'ichi Katō, had been purged by Americans from his former post at the largest and most prestigious prewar children's magazine, suspected of having promoted militarism and feudal values. He had

managed to form *Manga shōnen* only by registering it under his wife's name.[19] Even Tezuka's early manga were indirectly monitored, and in 2006 several of them—presumably now worth a small fortune—were discovered in the University of Maryland's Gordon W. Prange Collection, where Japanese postwar publications collected by the Occupation are archived. Of Tezuka's work then appearing, most were naïve stories for small children or were set overseas; only one, *Tameshigiri*, a 1948 six-panel gag strip showing a samurai testing out his sword on another human, might have caught the censor's eye.[20]

In this environment, the existing big-name artists in Japan were working at a disadvantage, in effect compromised by their prewar success. The best known children's manga artist at the end of the war, Suihō Tagawa, was famous for *Norakuro*, which was about a black stray dog that joined the Imperial Army and eventually fought the Chinese (depicted as pigs) on the continent. Keizō Shimada, another big prewar star, was best known for a series about a young boy who taught primitive South Pacific natives the superiority of Japanese ways. Such works were virtual advertisements for Japanese imperialism, but as the war turned against Japan even these manga fell out of favor with the militarists, who eventually coerced nearly all children's artists to stop working. After the war, these same artists were able to return to productive lives, but they had to work in totally new genres with different story lines to avoid American censorship. It is no coincidence that in the immediate postwar years, science-fiction manga, Tarzan tales, and American Westerns were particularly popular.

Tezuka thus arrived at a time when both editors and readers were looking for something new. He was extraordinarily talented, young, and untainted by the past. Moreover, he drew in a revolutionarily new and American style, and he liked to draw entertaining stories that were set in the future. *Mighty Atom*,

the reworked story starring a little boy robot, began serialization in *Shōnen* in April 1952, the same month that the American occupation of Japan formally ended, along with American censorship of Japanese media. The past might be thoroughly discredited, but in Mighty Atom young Japanese readers could imagine a better world in the future, where marvelous things might happen. Atom was a Japanese superhero who, unlike his American counterparts, fought not only for justice but also for peace. He was a robot, but he was also a friendly, cute character who looked like a schoolboy. For the children of Japan at the time, Atom was the ideal companion to lead them into that future.

3 Designing a World

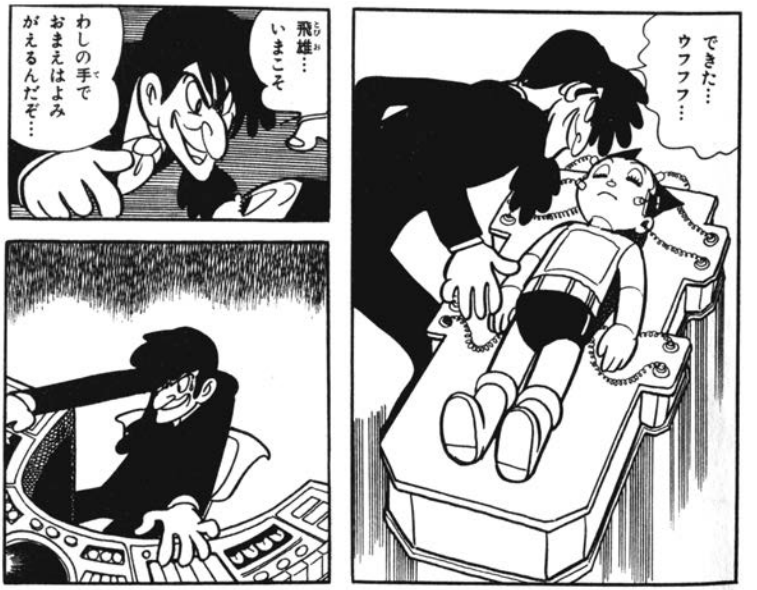
Although most Japanese know the core story of the *Mighty Atom* series, they often have very different mental images of it and of Atom's character. The impressions depend largely on what point in history they were exposed to the work, how old they were at the time, and whether they saw it in magazines, newspapers, paperback compilations, or later, in television animation.

Tezuka created his Mighty Atom character in a somewhat haphazard fashion as part of a story in *Shōnen* in 1951, but he did not make Atom the star of his own series until 1952. Tezuka continued to draw the *Mighty Atom* series in the same monthly magazine until it went out of business in 1968, but he also later serialized other *Atom* stories in the *Sankei* newspaper, in the *Tetsuwan Atomu Fan Club* magazine, and, as late as November 1981, in a publication for second graders. Over the years he was naturally able to rethink some of his original ideas, and for each publication and readership he tended to alter his drawing style and story lines slightly. As if that were not enough, unlike American comic book artists at the time (who were usually were

just one member of a larger production system established by a publisher), Tezuka had complete control over his work and often revised it by himself.

Like a movie editor who loves to cut and splice film, Tezuka seemed to get a real thrill out of revising. Sometimes the revisions were necessary because episodes initially serialized in magazines would not fit properly into the number of pages allotted in later paperback compilations, or onto different page sizes. But for Tezuka these revisions involved more than simply resizing images or cutting and pasting. In many cases he would redraw individual panels to make them fit better into a new layout or rework entire sections, adding or subtracting pages and changing things around to suit his evolving tastes. At times he even seemed to regard the original magazine versions as a type of rough draft and every subsequent paperback collection as an opportunity to further polish his stories. Since *Mighty Atom* appeared in over ten different editions of paperback collections while Tezuka was alive, it can now be hard to know what some episodes were really like in their original format.

On top of this, when Tezuka animated his manga series for a weekly television show in 1963, he had to tailor his work to a less sophisticated mass audience, in essence to make his stories simpler. Inevitably, these styles developed for animation began to affect the styles that he used for his manga story. Furthermore, since the television series required fifty-two episodes per year, it soon outpaced the original manga production, so Tezuka had to create new stories exclusive to the TV series, and he often had to farm out the writing to other people. Thus, not all the manga stories were animated, and not all the animation episodes have manga counterparts. To complicate matters further, in 1980 Tezuka created a new color version of his originally black-and-white 1963 TV series, and, in 2003, fourteen years after his death, his company and Sony Pictures created



© 1999 Tezuka Productions

Dr. Tenma replicates his dead son. From "The Birth of Mighty Atom," first created for the Asahi Sonorama collection of Tetsuwan Atomu, *vol. 1, June 20, 1975.*

yet another version with very different stories and computer-enhanced designs.

❍ ❍ ❍

Despite the different versions of *Mighty Atom* in existence, there is a core story line that was developed in the original manga series, and it is quite simple.

At the beginning of the twenty-first century, Dr. Tenma, the brilliant director of the Ministry of Science's Department of Precision Machinery, tragically loses his beloved only son, Tobio, in a car crash. Using the "cream of Japanese technology," he creates an advanced robot to replace his son. This robot is truly state-of-the-art with unprecedented functionality, but

Tenma has been slightly unhinged by his real son's death, and when he discovers that his surrogate robot-son does not grow, he becomes enraged and sells him to the circus. Thereafter he loses his job at the Ministry of Science and becomes a mysterious hermit-like figure, only appearing in his robot-son's life at rare intervals in an unpredictable and not-always-benign fashion. His attitude toward robots is complicated, and instead of believing that they should be treated like humans, he essentially believes that they should be slaves.

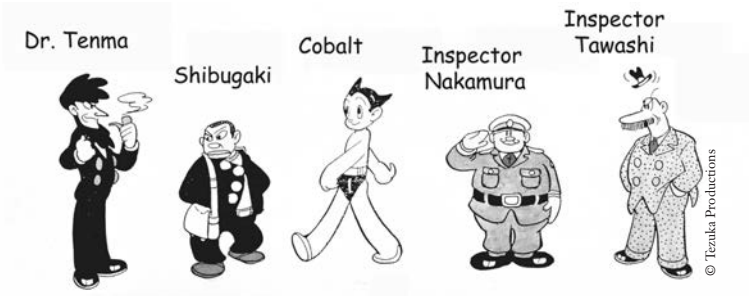
In this world, robots and humans coexist, but most of the robots are far more primitive than Dr. Tenma's creation, which is capable of truly humanlike emotions and reasoning. In the circus, the boy robot is given the name "Atom" and forced to participate in gladiator-like fights where, much to his dismay, he must destroy his robot opponents. One day, however, he is spotted by Professor Ochanomizu, the scientist who has succeeded Tenma at the Ministry of Science. Like Tenma, Ochanomizu is a roboticist who is obsessed with robots, but he has a far greater understanding of and affection for them, and among robots he is regarded as almost a savior figure. Realizing what a truly advanced and superior robot Atom is, Ochanomizu manages to free him from the circus. A kindly (but sometimes emotional) man with a huge nose, he thereafter becomes Atom's surrogate father and always tries to help him.

Since Atom was designed to be a replacement for Tenma's son, he looks like a ten or twelve-year-old boy, but he has seven special powers built into him. Using jets in his feet and arms, he can fly through air; he speaks sixty languages fluently and can sense whether people are good or bad; he can amplify his hearing a thousand times and use his eyes as searchlights; and he has machine guns in his fanny. To make all this possible, he has a computer brain and a 100,000 horsepower atomic reactor in his chest.

Main characters in the Mighty Atom *world, drawn by Tezuka for the second volume of Kōbunsha's* Mighty Atom *paperback collection in 1957.*

Main Characters in 1963 *Mighty Atom* Manga/Animation, and U.S. *Astro Boy*

*** Japanese Name * Romanization * Translation**	**Description (Manga Series)**	**1963 U.S. *Astro Boy* names**
鉄腕アトム *Tetsuwan Atomu* Mighty Atom ("Atom")	Boy robot. Hero of story.	Astro Boy
天馬博士 *Tenma Hakase* Dr. Tenma	Brilliant scientist who created Atom to replace his son.	Dr. Aster Boynton II
トビオ Tobio	Dr. Tenma's beloved son, killed in car crash.	Aster Boynton III
お茶ノ水博士 *Ochanomizu Hakase* Professor Ochanomizu	Head of Ministry of Science and roboticist. Atom's guardian, friend, and creator of his family.	Dr. Packadermus J. Elefun
お父さん *Otō-san* Dad	Atom's robot-father.	Papa
お母さん *Okā-san* Mom	Atom's robot-mother.	Mama



ウラン Uran	Atom's robot–little sister.	Astro Girl
コバルト *Kobaruto* Cobalt	Atom's robot-brother.	Jetto
伴俊作 *Shunsaku Ban* aka "ひげおやじ" *Higeoyaji* ("Mr. Mustachio")	Atom's grade school teacher, and private-eye adventurer.	Mr. Percival Pompous
敷島健一(ケンイチ) *Shikishima Ken'ichi* Ken'ichi Shikishima	Atom's popular and well-behaved classmate.	Ken (never appears in anime).
四部垣 Shibugaki	Atom's big, tough-guy classmate.	Vinny (Dinny)
大目玉男 *Ōme Tamao* Tamao Ōme	Atom's introverted classmate. (Tezuka's alter ego?)	Specs
田鷲警部 *Tawashi Keibu* Inspector Tawashi	Plainclothes detective, usually suspicious of robots.	Detective Inspector Gumshoe
中村警部 *Nakamura Keibu* Inspector Nakamura	Uniformed police officer, generally likes robots.	Police Chief McClaw

Professor Ochanomizu nonetheless tries to help Atom integrate into human society and even to attend elementary school (depending on the episode, he was somewhere between the third and sixth grades). But as a brand-new robot there are still many things that Atom does not know and must learn, and many aspects of human "common sense" that he has difficulty understanding, sometimes making him seem rather "bumbling." This plot device allowed Tezuka to inject a great deal of humor into his stories, and it proved enormously popular with readers, in effect humanizing Atom. In the story, to assuage Atom's loneliness and give him a more humanlike upbringing, Professor Ochanomizu also decides to create a robot family for him. He gives Atom an even more bumbling robot-father and an earnest, sweet mother, and later a sister (Uran) and a brother (Cobalt), but none of the other family members are as advanced as Atom. To the delight of young Japanese readers, while appearing "older" than Atom the parents were of course really "younger" (having been created later), and not quite as intelligent as him. In the episode "Atom Goes to Elementary School," Atom attends Ochanomizu Elementary School as a fifth grader, but his parents have to enroll in the first grade.

At school, Atom tries to act as much as possible like a normal human boy. Unlike most American superheroes, he has no "secret identity," yet he is able to blend in well, only rarely using his special powers. Approximately the same height and weight as his other schoolmates, he dresses in a typical 1950s-style schoolboy uniform of a front-buttoning black coat and short pants, and carries a knapsack-satchel to school. He has several pals, who are archetypes of typical Japanese schoolboys, and they are conveniently able to forget that their robot-friend is a walking nuclear power reactor. Ken'ichi is the good-looking, good student type; Tamao is a glasses-wearing, scrawny boy who is often harassed by other kids (and with whom Tezuka probably

identified); and Shibugaki (whose name sounds like "bitter persimmon"), is the big, tough kid who hates to do homework, but who is actually somewhat spoiled—his parents are wealthy art collectors.

Atom's teacher is Shunsaku Ban, nicknamed *Higeoyaji*, or "Mustachio," because of his huge handlebar mustache. Mustachio is one of the main characters in many *Mighty Atom* episodes, and not only because he is Atom's teacher; he is also an expert in judo and other martial arts and an amateur private eye who likes to get involved in exciting, complicated cases. Other prominent characters include the Laurel and Hardy–like police inspectors Tawashi and Nakamura, as well as a raft of regular evil characters such as Skunk Kusai, Hamegg, and Acetylene Lamp. Then there are the robots of all shapes and sizes, both good and bad, who populate the world of the early twenty-first century, and with whom Atom must sometimes cooperate, sometimes fight, and sometimes save. Atom himself always tries to help humans.

To the delight of readers in 1952, although *Mighty Atom* was set fifty years in the future, the "future" that Tezuka depicted was a mixture of both the familiar and the futuristic. Atom's schoolmates wore typical Japanese schoolboy uniforms of the day, which were modeled after nineteenth-century Prussian army uniforms but allowed short pants. Mustachio, their teacher, sometimes wore Japanese wooden clogs and a threadbare business suit. And amid the skyscrapers, robots, and flying cars of future-Tokyo, there were occasionally old, run-down houses and streets of the early 1950s. As Tezuka later wrote, "If I were to draw a *really* futuristic city, it would look too strange to readers. They wouldn't be able to identify with it at all. So to make people feel more comfortable I occasionally include things from the era they know. . . . It's always an issue when drawing sci-fi manga."[21]

❍ ❍ ❍

Unlike many of Tezuka's other manga—where a single story could run to hundreds, if not thousands, of pages—*Mighty Atom* was not one long serialized story, but a string of independent episodes only very loosely strung together. In the beginning, the episodes were extremely short and often limited to around eight pages; in later years some episodes might run to twenty pages or more, and three or four serialized episodes might form a complete story. The disadvantage of this for Tezuka was that he was unable to develop the long-arc, novelistic story lines at which he excelled. The advantage was that it gave him the opportunity to create a seemingly infinite variety of stories as long as he used Atom as the hero. It meant that Tezuka was able to unleash his imagination and explore many different scenarios and situations, in effect making the entire manga series a sort of Whitman's sampler of diverse ideas. To the shock of fans, the initial black-and-white TV-animation series ended in 1966 with Atom diving into the sun to save Earth, but in a new manga version Tezuka subsequently created for the *Sankei* newspaper, he went back and developed an alternate scenario. In it, he took Atom back in time and into the future, and further developed the story to satisfy both his fans and himself.

The readers of the *Mighty Atom* manga may have been mainly children, but Tezuka was an intellectual of a caliber that appears only rarely in the world of comics, and his stories have remarkable variety and depth. His series proved far more popular than he had ever imagined, and he thus kept drawing it far longer than he had ever imagined. To keep himself from getting bored, he had to incorporate subjects that interested him personally, and these also reflected the concerns of his age. The title of the 1959 work "Ivan the Fool" is derived from Russian folklore; the story is set on the moon and foreshadowed (by six months) Russia's success in orbiting a satellite around the moon

that same year. The 1962 episode "Robot Land" about a robot theme park was inspired by a tale penned by the famous Japanese mystery novelist, Edogawa Rampo, and hinted at the American sci-fi film, *Westworld*, created in 1973. The 1956 story "Yellow Horse" was a seemingly prescient work about drug addiction, but it reflected the epidemic of amphetamine abuse that had inflicted Japan in the early postwar years. The 1960 work "Invisible Giant" was inspired by the 1958 Hollywood film *The Fly*. And in 1967, during the Vietnam War, Tezuka would also create "The Angel of Vietnam," sending Atom to protect Vietnamese villagers from American B-52 bombers, which he intercepted and tied-up in pretzel shapes.

This variety resulted in a readership far more diverse than that for most manga, which were at the time still read almost entirely by children, especially boys. By 1964, sales of the Kappa-Comics paperback version of the *Mighty Atom* manga were breaking records, surpassing one million copies and foreshadowing the emergence of manga as a true mass medium many years later. An ad for the books in the *Tokyo shimbun* newspaper that year ran testimonials from a novelist, a university professor, and even a sumo wrestler, all of whom not only recommended the books for children, but unabashedly and publicly declared that they loved to read them themselves. The young sumo star stated, "Atom is small but very powerful, and I learn a lot from the way he carries himself." [22]

❍ ❍ ❍

Over the decades, Tezuka experimented with different art styles and refined his drawings of the characters in *Mighty Atom*. Yet anyone familiar with comics can see that Tezuka's biggest stylistic inspiration is the rounded style of Walt Disney, whose work he adored. In his early years, Tezuka had spent hours copying the style of Disney characters in comics and animation, and in

1951 and 1952 he even illustrated Japanese versions of *The Story of Walt Disney*, as well Disney's *Bambi* and *Pinocchio* for *Manga Shōnen* magazine. Copyrights were more loosely enforced in Japan than they are now, and given the fact that the Walt Disney Company was accused of copying Tezuka in the 1990s, it is interesting to note that Tezuka's manga version of Disney's *Pinocchio* animation was not officially licensed.[23]

Because of Tezuka's work in popularizing the long cinematic "story manga" that are so prevalent in Japan today, he has been nearly deified in the media. Only recently, many years after his death, has it become possible for most writers to objectively examine his work and his influences. Although Tezuka was a pioneer and a brilliant innovator, he was also like a sponge, soaking up influences from whomever or whatever he admired, whether novels or films or art styles, often using them deliberately in a type of homage. In reality, his art style owes a great debt not only to Disney, but to Max Fleischer (creator of the big-eyed Betty Boop), as well as Japanese artists who preceded him, such as Ryūichi Yokoyama, Suihō Tagawa, and Noboru Ōshiro. Toward the end of his life, Tezuka was more than willing to admit that his style was a potpourri of influences, and he even seemed to enjoy speculating on what might have inspired him as a youth. He spoke freely of times when he, as a child, religiously traced American newspaper comic strips such as George McManus's *Bringing Up Father* (otherwise known as "Jiggs and Maggie"), and suggested that the crowd scenes and backgrounds in his early works were probably influenced by those of McManus. He also recounted having devotely studied the comic strips of other popular prewar American artists such as Milt Gross.[24]

Specific influences aside, for his manga Tezuka adopted a streamlined style of character drawing that was almost entirely based on ellipses. It was actually an old technique of animators,

and it allowed him to draw at a remarkable speed and to develop his more "cinematic" and novelistic style, for he could create longer and more dynamic works. To those familiar with comics and character design, Tezuka's *Atom* character is reminiscent of the American "Kewpie" doll character, created at the beginning of the twentieth century and currently used as a logo by a Japanese firm of the same name for its mayonnaise and other products. But it also closely resembles an American cartoon character that was popular around the same time in America in both comic books and animation: Paul Terry's *Mighty Mouse*, which was in essence a furry-animal "cartoon" parody of the *Superman* story. In fact, Tezuka once wrote, "Atom's father was in effect Mighty Mouse, whose father was Superman. And that's the reason I used the [English] subtitle of 'Mighty Atom' on the opening page when I first serialized the story. You can also see the resemblance to Mighty Mouse in the flying scenes, where Atom has one hand out in front of him, in a fist."[25] At other times, Tezuka did not hesitate to speculate on the similarities between Mighty Atom and Mickey Mouse.

So many Tokyo publishers began to seek out Tezuka that he moved there in 1952. As was true for the rest of his career, he liked to please people and typically accepted too much work from too many magazines. No matter how fast he drew (and he was one of the fastest), he simply could not keep up with the demand. The result was a line of embittered editors from competing magazines, who were always lounging about in the reception area of his studio, waiting for him to complete stories for them (sometimes fighting among themselves). When Tezuka finally reached his physical limits, he had no choice but to call on help, and he began enlisting talented young artists to aid him in some of the more mundane drawing tasks, such as inking the black spaces in the illustrations, drawing the frames around panels, and so forth. In this way, he developed what is now known in

Japan as the "production system," in which a successful manga artist employs multiple assistants to help him or her crank out up to three or four hundred pages of manga a month. It is a system utterly unlike that traditionally used in American comic books (where, until recently, the artist was often only one member of a team of writers, inkers, colorists, and letterers all controlled by the publisher). With Tezuka's way of doing things, the artist maintained control and in effect performed a role similar to a director, assigning tasks to assistants. Today some manga artists in Japan with production systems may do little more than ink the eyes of their main characters, but not Tezuka. He was an extreme perfectionist, always reluctant to relinquish any creative control. As a result, he nonetheless would do most of the work, creating the story, penciling and inking the main characters by himself, and then having assistants mainly do backgrounds and finishing work. But by creating the production system, Tezuka wound up training a generation of younger artists who went on to become household names in their own right, and further developed the "story manga" format that he had pioneered.

As Tezuka drew his *Mighty Atom* series, he sometimes experimented with character designs, developing a certain "look" as he went along. It is something that happens to most cartoonists or animators as they draw. It is also the reason that Disney's 1934 Donald Duck looks quite different than it did in 1960, or that Charles Schulz's 1950s Charlie Brown character looks so different in the 1970s. Eventually, of course, to avoid confusion, the character's "look" must be codified to some degree, especially if it is ever animated or turned into merchandise and other people have to work on the design.

As most schoolchildren in Japan know, Atom is usually drawn with five eyelashes above each eye. Also, he has horn-like objects on his head, which are actually locks of plastic "hair" and, like Mickey Mouse's ears, are always visible no matter

which way his head is turned. According to Tezuka, the idea for this came from his own hair, which (when he was young and had a full head of hair) used to stand up on both sides after he took a bath. As thousands of young Japanese children have discovered when bathing, it is something they can easily replicate on their own heads with a liberal application of shampoo. Meanwhile, the Pinocchio tale inspired other aspects of Atom's character design. And the briefs and red boots that Atom wears when not in his school uniform are presumably an homage to Superman or Mighty Mouse.

Throughout most of the life of the manga series, Atom (and most of the characters in the story) was drawn with only four fingers. This was a device pioneered in the United States and still used with many Disney characters. It was done primarily for ease of drawing, and because five fingers, when rendered in cartoon style, often wind up looking like too many fingers on one hand. In animation, it also becomes particularly difficult to make the hands look realistic, as Tezuka sometimes noted, making a hand in motion appear to have six fingers.[26] Toward the end of his career, however, Tezuka always drew Atom with five fingers, and according to the Tezuka Productions Master Guideline, any new images of Atom created for advertising or other purposes now *have* to show him with five. What is often not mentioned in Japan is that this shift came about because of protests from groups that work to defend the rights of the *burakumin*, or descendants of an outcast group of Japan's feudal period. Many of this minority group's ancestors were involved in activities frowned upon in traditional Buddhist society, such as working with leather or occupations related to death or animal slaughter. As a result, in Japan four fingers can also be a way to represent *yotsuashi*, or "four legged" animals, and—by extension—an unflattering way to refer to the *burakumin*.

At times Atom's "look" changed quite radically, as

Photo © 2003 Frederik L. Schodt

Mighty Atom's foot- and handprints in the sidewalk in front of Takarazuka City's Osamu Tezuka Manga Museum.

Tezuka sought the perfect level of realism and cuteness. In the beginning of the series, as he later lamented, he was under tremendous pressure and hadn't fully worked out the story or designs. As a result, the faces of some of the supporting characters, such as Atom's father and mother, shifted in nearly every panel, the father having a mustache in some panels and not in others. This was partly the result of Tezuka's having been isolated in a hotel room by editors in a Japanese practice known as *kanzume*, or "canning," which is used to put inordinate pressure on artists, and also from people helping him who were unfamiliar with Atom's basic design. Over the years, in different stories, Atom's proportions also shifted, his limbs or torso sometimes longer than at other times. Tezuka was an extremely competitive person, and when fashions in the manga world changed from the cute, Disney-esque style that he had popularized to a more realistic look—as symbolized by the more realistic *gekiga* (action pictures) boom of the late sixties—he tried to adapt by making Atom taller and more serious-looking. "But the weird thing is," Tezuka later wrote, "even though he was supposed to be 'cool,' the taller [Atom] got, the less readers liked him. So right after that I started drawing him like a cute kid again, and sure enough his popularity went up. Why, I dunno."[27]

Before perfecting his production system, if Tezuka was overwhelmed by other deadlines or fell ill, he occasionally had to let others stand in for him. Once, when he was ill, the editors

had another up-and-coming manga artist, Jirō Kuwata, draw the last part of "Shoot-Out in the Alps," serialized in 1956. When the story was later compiled into paperbacks, Tezuka—in typical fashion—went back and redrew most of the pages. Many of the most famous manga artists of the sixties and seventies, such as Fujio Akatsuka, Fujiko F. Fujio, Fujiko Fujio (A), Leiji Matsumoto, and Shōtarō Ishinomori, helped Tezuka in their youth in some form or another, on some work or another. And in *Mighty Atom*, their work can still be spotted. Ishinomori's cross-hatched backgrounds are easily identifiable in the 1955 episode "Electro."[28]

The *Mighty Atom* manga owed their success not only to the originality of the stories, but to what today might be called their "classic" look: the Disney-esque style with the endearing, rounded, clean lines that Tezuka eventually developed. It was a look initially regarded sometimes as being *battā kusai*, or something that "smells like butter" and is too "foreign" in appearance. But it soon became the default style of nearly all manga in Japan, because so many younger manga artists in the fifties and early sixties idolized and imitated Tezuka. It in fact took many years for artists to begin to break away from his style.

❍ ❍ ❍

Another hallmark of Tezuka's *Mighty Atom* and his other early manga is the influence of live theater. As noted previously, Tezuka grew up in the town of Takarazuka, near Osaka, famous for its all-female theater troupe of the same name, its hot springs, lush hills, and amusement park. It was, for a child, a sort of paradise, and today probably akin to growing up next to Disneyland. The theater showcased elaborate revue-style performances, with song and dance performed by young women playing both male and female roles, the audience also being largely female.

Courtesy, Tezuka Productions.

Osamu Tezuka the actor in a student production of Dostoevsky's Crime and Punishment, *which ran November 27–28, 1947. Tezuka is on the far left.*

The productions were romantic, with elaborate, flowery stage designs and stories often set in foreign locales. Foreign stories that did not contribute to the war effort were generally banned after the militarists took control of Japan, but perhaps because Japan was allied with Germany and Italy, a production of *Pinocchio* was held in the tense year of 1942 after war had been declared on the United States. As Haruyuki Nakano, the author of the book *Tezuka Osamu no Takarazuka* (Osamu Tezuka's Takarazuka) notes about the theater before the repression of the war years and after:

> The musicals were set in Paris, New York, and royal Arabian or Chinese courts, in eras that ranged from the Middle Ages with knights or pirates, to the distant future. For children (and probably adult viewers, too), the stage

> of Takarazuka was like a ship that traveled the world, like a time machine that transcended time.[29]

Before the war, Tezuka's mother regularly took him to these shows, and he became hooked. He later wrote that they may have been "shameless appropriations of Broadway musicals or poor imitations of the Folies Bergère or the Moulin Rouge, but I wasn't aware of that, and considered them the highest form of art in the world." When actresses on the stage exclaimed, "Ah, lovely Paris!" or "Ah, Manhattan and Broadway, the capital of our dreams!" Tezuka said that he would be so addicted to the dreams and longing portrayed that he would "fall into a state of delirium."[30]

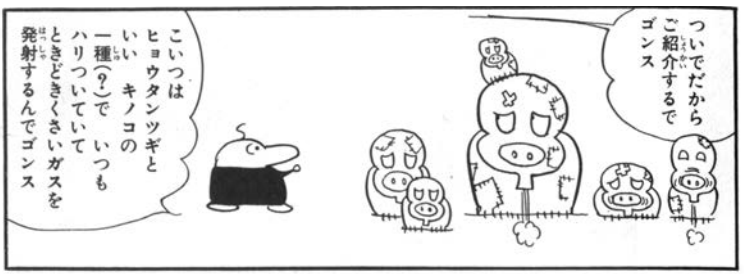
Nakano notes that many aspects of Tezuka's manga can be traced back to this influence of Takarazuka and its environs. Tezuka's very early children's manga, especially *Tsumi to batsu* (*Crime and Punishment*) and works he later created for girls, such as *Ribon no kishi* (Princess Knight), often had page designs that directly evoked stage sets, or gender-bending stories, crowd scenes, and exotic foreign locales à la the Takarazuka theater. These styles especially influenced the creators of the shōjo, or "girls'" manga genre, which Tezuka later helped to develop.

And there is more than a whiff of Takarazuka-style bisexuality in *Mighty Atom*. Tezuka once declared in a 1978 interview that he had originally intended his Mighty Atom to be an alluring and beautiful female android; the only reason he made Atom a male robot with super powers, he said, was that he was drawing in a manga magazine for boys. But the unintended consequence of this has indeed been far-reaching. As the *Asahi* newspaper editorialist quoted at the beginning of this book suggests, Atom's androgynous, cute, and long-eyelash design has directly influenced the unisex look of the male protagonists so popular in nearly all girls' manga today.[31]

Immediately after the war, the young Tezuka became an

even greater fan of Takarazuka productions and of theater in general. He had always loved to write stories as a child, but now he began appearing in local student drama productions and drawing short comic strips and cartoons for Takarazuka theater fan magazines. His younger sister, Minako, recalls not only his cartooning zeal, but also his infatuation with theater. Right after the war, the two of them went to Osaka to see yet another performance of *Pinocchio* by the Takarazuka group, and she is convinced it is one of the main inspirations for *Mighty Atom*. "My brother," she stated in 2003, "was so infatuated with the production that he remembered all the songs and the dialogue. In the scene where Pinocchio comes to life and starts moving, I can really see the birth of Mighty Atom."[32]

It was this theatrical influence that led Tezuka to start his now-famous "star system," which remains one of the most unusual innovations he made in the world of manga, and which has not been widely adopted by other artists. As a child, Tezuka often created characters to be "actors" and used them in the long manga that he drew, such as an early, unpublished version of *Lost World.* By doing so, he could act like the director of a Takarazuka musical revue or a Hollywood film and cast his characters in different roles, in different stories. Later on he de-emphasized his star system, but with *Mighty Atom* it is still in full view. Thus, characters such as Mustachio, Dr. Ochanomizu, Lamp, Hamegg, etc., also appear in many other Tezuka works, just like actors, often under different names. And many of these regular characters are based on real people. The usually evil character, "Lamp," is based on an old school chum who had a flat depression in the back of his head, so Tezuka often draws him with a candle on his head. Kim Sankaku, another usually bad character, is based on the local watchmaker's son. If not based on real people, many supporting actors are inspired by famous movie actors, since Tezuka was also a serious movie buff,



© Tezuka Productions

"Spider" and Hyōtantsugi from the Sunday Comics Tetsuwan Atomu *series, vol. 10.*

who in addition to drawing manga and making animation also often wrote articles on film. The thick-necked character, Boone Marukubi, is modeled after the French actor Lino Ventura. Yet another character was inspired by James Mason. And among Tezuka's stable of "actors" there are also purely nonsensical gag characters who are assigned impromptu roles. *Hyōtantsugi*, a silly patched-up mushroom-gourd, often flies out of nowhere at the most inappropriate moments. Spider, a small, big-nosed character with huge feet and no arms, also often pops out of nowhere to announce *omukae de gonsu*, which loosely translates to "here ta meet ya!" Invented by Tezuka as a small boy, these characters are used solely for comic relief.

❍ ❍ ❍

As a work-in-progress for nearly two decades, the *Mighty Atom* series has many weaknesses and discontinuities. To non-Japanese and to those unfamiliar with the conventions of manga, Tezuka's use of cute, Disney-esque characters in serious stories (often with deep meanings) can create a mental dissonance. To the uninitiated, it can be disturbing to see children's characters act like their adult counterparts in Russian novels: to be introspective, to agonize, to commit acts of both good and evil, and

to even die. On top of this, Tezuka's star system requires prior knowledge of the system to fully appreciate it, and his deliberate use of gag characters to break up the flow of a serious story's plot can be frustrating to the point of exasperation. All these aspects of Tezuka's manga stories—including *Mighty Atom*—have been great obstacles in trying to popularize his early work outside of Japan.

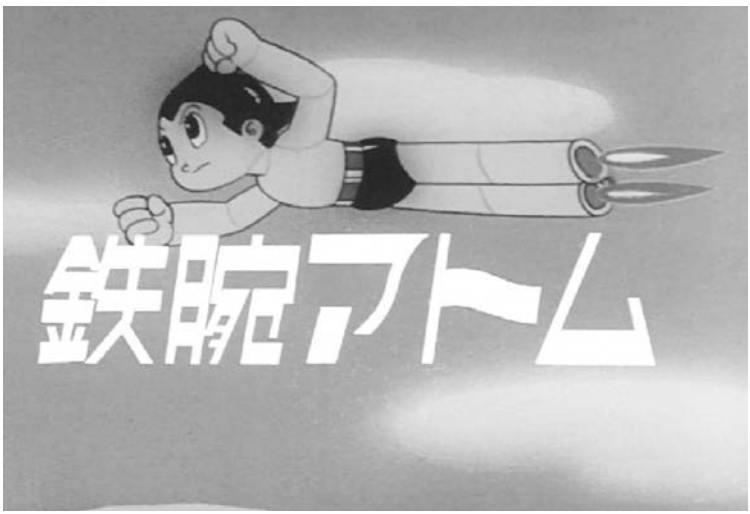
Nonetheless, the world that Tezuka designed for *Mighty Atom* hit a certain sweet spot in the Japanese national consciousness. Over the decades, the eccentric aspects of this design allowed Tezuka to have a special, intimate dialogue with several generations of fans, who learned to ignore the inconsistencies and love every aspect of his work.

4

Mighty Atom, TV Star

On January 1, 1963, *Mighty Atom* blasted across TV sets throughout Japan, thrilling young viewers across the land. The show was in black and white, and compared to smoothly flowing Disney animation from America, it looked crude and herky-jerky, almost static. Still, it was Japan's first true weekly TV animated series, and if the manga series had been a huge hit among children of grammar school age, the animated series acted like the booster jets in Atom's feet, launching the little boy robot into the stratosphere of popularity. As the media soon trumpeted, even little "Naru-chan"—grandson of the then-reigning emperor, Hirohito, and today's crown prince—was a huge Atom fan. Although no one could have realized it at the time, the animated series would not only make Atom a national icon, but also help change the course of animation history and set the stage for Japan's eventual global domination of the industry.*

*Technically speaking, *Mighty Atom* was not the first domestic TV-animation series aired in Japan. That honor belongs to *Instant History*. Broadcast weekly from 1961 to 1962, it was only three minutes long with only one minute actually animated, but that was enough to earn it a footnote in history.



© 2007 Mushi Productions/Tezuka Productions

Opening scene of the 1963 animated Mighty Atom.

For Tezuka, animating *Atom* was the culmination of a long-held dream. In fact, had it not been for the war, Tezuka would probably have begun creating animation much earlier and possibly even skipped his entire career as a manga artist. As he used to joke much later in life, while manga were like his wife, animation was like his mistress—the implication being that while he loved manga, his passion for animation was almost beyond control.

❍ ❍ ❍

Tezuka's infatuation with animation dated back to his early childhood. He was born in 1928, the same year that Walt Disney released *Steamboat Willie*, one of the earliest animated shorts with sound, a work that also featured and made famous a character named Mickey Mouse. And for a future manga artist and animator, the Tezuka home was a privileged and perhaps perfect place to be. It had numerous popular manga books, a piano, a record player, and even a telephone in an era when most families

had none of these things. Not only that, Tezuka's father, Yutaka, owned a German Leica still camera, a home movie camera, and even a special hand-cranked film projector called a Pathé Baby, which showed film in a now highly rare 9.5 millimeter format.[33] As a result, at home Tezuka saw foreign shorts such as *Mickey Mouse*, *Felix the Cat*, and the cartoons of Max Fleischer over and over, and he also had the opportunity to see some of the earliest Japanese animated works, such as Yasuji Murata's *Tako no hone* (Bones of an Octopus) and *Norakuro* (Black Stray). Most of these cartoon shorts were silent, but they often had subtitles, and some even came with an early version of sound. Referring to the 1929 Disney short, *Mickey's Choo Choo*, Tezuka writes:

> There was a record that accompanied the film, and when you started showing the short with the projector, you'd count "one-two-three" and then set the needle on the phonograph. With that, the record would provide music and some dialogue to accompany the moving picture. Of course, the picture and the sound would eventually get out of sync, but the nice thing was that the projector was one of those old, ratchety hand-cranked versions, so you could slow down the film and let the sound catch up again.[34]

Later, in middle school, Tezuka even created his own experimental animation by borrowing a new 8 mm movie camera that his photo-crazy father had miraculously acquired. He had to improvise a wooden framework on which to attach the camera, and he shot nearly three hundred drawings of his beloved character, *Higeoyaji* (Mustachio), one by one, without any special lighting. When developed and run through the projector, Mustachio actually moved, but only for about ten or twenty seconds, and the light flickered and faded constantly. "I remember feeling a thrill," Tezuka recalled much later, "but I was also made painfully aware of how hard it is to create animation."[35]

As a child, Tezuka also regularly visited the local movie theater with his mother, the two of them enjoying early Walt Disney colored shorts and *Popeye* cartoons by the Fleischer brothers. When World War II began, American animation was banned in Japan, but Tezuka saw some of the pioneering Japanese works such as Kenzō Masaoka's artistic 1943 *Kumo to chūrippu* (The Spider and the Tulip), and as the war went on, propaganda pieces such as Mitsuyo Seo's *Momotarō no umiwashi* (Momotarō's Sea Eagles). The latter was Japan's first animated theatrical feature film. It starred a young human boy, Momotarō, who led dogs, monkeys, and pheasants in an aerial attack on an island fortress à la the successful attack on Pearl Harbor. Tezuka was not particularly impressed with the Japanese animation films made for propaganda purposes (or with most Japanese animation, for that matter), but there was one major exception, and that was a sequel of sorts by Seo titled *Momotarō: umi no shinpei* (Momotarō: Divine Sea Warriors). Produced in 1945 near the end of the war under order of the Imperial Navy, this feature-length black-and-white work is now regarded as a classic of early Japanese animation. Consisting of nine reels and created with a then astoundingly high budget of ¥270,000, it featured Momotarō again leading a team of animals, this time in a parachute drop onto an Asian kingdom south of Japan, liberating it from white colonial oppressors.

Later, Tezuka often wrote how this film moved him, not for its theme so much as for its technical excellence and for the circumstances under which it was created. As he noted, when it was released, both Tokyo and Osaka were already charred landscapes and the Japanese military was on its knees, so it was hardly the time to watch movies.

> After all, the audience for the film—children—had all been evacuated to the countryside, so hardly anyone even

> noticed the film when it came out. I sat in the freezing Shōchikuza movie theater, which had somehow survived the bombings, and watched the film. I watched, and I was so impressed that I began weeping uncontrollably. The lyricism and the child-like spirit in all the reels were like a warm light, illuminating my mummified spirit, depleted of both hope and dreams. I swore then: "I will someday make my own animated films."[36]

When the war ended and foreign films could again be seen in Japan, Tezuka made up for lost time. Always a huge film buff, he saw as many as he could, in one year viewing over 365 films, which in the pre-video era was no ordinary accomplishment. Of the animated films he saw, it was Walt Disney's features that he particularly loved, watching Disney's *Bambi* (1942) over eighty times and *Snow White and the Seven Dwarfs* (1938) over fifty times.[37]

A couple of years after the war ended, after debuting as a manga artist but while still enrolled in medical college, Tezuka visited the Tokyo studio of Iwao Ashida, one of the pioneering animators in Japan, with the idea of finding employment. He was interviewed and took a test, but was rejected, partly because Ashida saw how successful Tezuka already was with his manga (especially "New Treasure Island") and thought that he would never survive in the cut-throat, low-paying animation business. "Had I passed," Tezuka later wrote, "I probably would have given up on becoming a doctor, and given up drawing manga too."[38]

❍ ❍ ❍

For years Tezuka lived a sort of Jekyll-and-Hyde existence, wearing his white doctor's smock while studying medicine, and then switching to wearing his beloved beret while drawing manga. In reality, he was spending most of his energy in drawing and further developing the possibilities of his long, sprawling,

cinematic "story" manga, which incorporated many techniques from animation. By the end of the fifties, Tezuka had already helped to expand manga readership beyond young boys and, with hits like *Ribon no kishi* (Princess Knight, 1953–56), he had introduced his style into the now enormously popular genre of *shōjo manga*, or girls' comics, opening up a whole world of entertainment for females and opportunity for women artists. Tezuka was not yet a household word, but he was a celebrity among young manga fans and in the industry. And, since he retained control of his work, he was also generating considerable income that came from sales of serialized manga stories to magazines and from sales of paperback compilations, which generated royalties. In the 1960 edition of the annually published list of the top taxpayers in Japan, Tezuka led in the "artists/cartoonists" category. Since many smart people found ways to avoid paying high taxes, it was often joked in Japan that those who made this always-talked-about list were either stupid, wanted to be on the list for publicity purposes, or had made too much money too fast to figure out how to shelter their income. In Tezuka's case, the first reason certainly did not apply.

Yet not all was well in Tezuka's world. By 1960 some young manga artists were deliberately beginning to draw in a non-Tezuka style and trying to distance themselves from his Disney influences. They called their work *gekiga*, or "action pictures," and began to pursue increasingly adult, serious themes, drawn in a highly realistic style stripped of all Tezuka-style gags and designs. Since Tezuka was always an extraordinarily competitive artist who craved public recognition and popularity, these artists posed a huge psychological threat to him. He was thirty-two; he had already been drawing *Mighty Atom* episodes for *Shōnen* and other publications for nearly a decade, and some fans were beginning to accuse him of *manerizumu* (mannerism), or of falling into a rut. Later on he would revamp his style with other, more

adult works, and nearly beat the *gekiga* artists at their own game, but in the short term the result was profound doubt about what he was doing, depression, and a kind of nervous breakdown. It was time for something new.

❍ ❍ ❍

By the end of the 1950s, the Japanese economy had recovered from the devastation of World War II and was beginning to rapidly expand. Television broadcasting began in Japan in 1953, but most people were then still too poor to afford sets. By 1960, color broadcasting had started, and while few could afford color sets, the number of households that at least owned black-and-white ones had skyrocketed, many of them purchased the previous year during the fanfare of the crown prince's wedding. By 1963, most households had TVs, and television had become a true mass medium, creating new possibilities for entertainment.

In 1957, Tokyo TV (TBS) showed a version of *Mighty Atom* in the Japanese *kami-shibai*, or "paper-play" style, which uses a sequence of illustrated drawings accompanied by narration. Then, starting in the spring of 1959 and continuing until 1960, the brand new Fuji TV channel began broadcasting, as its debut offering, a live-action black-and-white drama version of *Mighty Atom*, airing sixty-five episodes in all; it starred a young actor named Masato Segawa, wearing a spiky helmet and awkward plastic body-armor designed to make him look like a robot. Also in 1959, after a formal introduction and two dates, Tezuka finally married an old family friend, Etsuko Okada, who would stand by him through thick and thin for the rest of his life. By 1961 he had moved into a new house in Tokyo and had a son, Macoto, and, in the midst of all this, he somehow earned his physician's license, receiving it for a thesis done at Nara Medical College on the sperm of pond snails, titled (in the

© Matsuzaki Productions/Tezuka Productions

Scene from an episode of the 1959 live-action Mighty Atom *TV series produced by Matsuzaki Productions.*

English abstract) "Electron Microscope Study on Membrane Structure of Atypical Spermatids." Despite the degree, Tezuka never practiced medicine, but it always gave him a unique status. At this point in Japanese history, medical doctors still had far more prestige than manga artists, so the idea that anyone would abandon a medical career to become a cartoonist was in itself provocative. As Tezuka later often joked, one of his former professors told him that he was doing his patients a great favor.[39]

During this period, the Japanese animation industry was still very undeveloped, and most animation that aired on television consisted of imports from the United States—usually short gag pieces that were strung together. The word *anime* had not yet entered ordinary language, and most people still referred to animation as *manga eiga* (*manga* "movies," that is, "cartoons"), *dōga* (moving pictures), or in the industry, *animēshon*. A few small studios created experimental shorts, commercials, or art films, but the main animation producer was a studio known as Tōei Dōga. Following the pattern of Walt Disney Studios, it produced highly realistic animation, including long feature films, in a labor-intensive process that required hundreds of people and often a year or two of production. In 1958, while still active as a *manga* artist, the animation-crazy Tezuka had signed up with Tōei Dōga and helped in both storywriting and direction for what became the full-color 1960 theatrical feature *Saiyūki* (Journey to the West). It was based on his own manga *Boku no Songokū*! (My Songokū!) and was one of three films he

contracted to work on with Tōei Dōga. It was his first real involvement in producing commercial animation.

❍ ❍ ❍

Tezuka always seemed to need goals and what he called *raibaru*, or "rivals," to spur him to work harder. Around this time, he even began to talk in the media about someday equaling and overtaking his ultimate hero, Walt Disney. With the experience gained at Tōei Dōga, he was finally in a position to carry out his dream of creating his own animation, but to do so would require a radically different approach than that for drawing manga. It is nearly impossible for a single individual to create traditional hand-drawn animation alone unless the artist is content with creating only extremely short works. Any animation more than a few minutes long usually requires an artistic team effort and an organization to support the production.

The reason for this is quite simple. In traditional live-action "movies," the human eye is tricked into seeing smooth, continuous motion on the screen when a filmstrip of sequential still images is run through a projector at a rate of twenty-four frames per second. In traditional hand-drawn animation, especially what is known as "full animation," early artists such as Disney tried to achieve this same fluidity, but in theory this requires someone to draw twenty-four illustrations for every second; these illustrations must then be photographed in sequence by a camera, edited, and projected. A ninety-minute feature-length animation produced in this fashion would thus require at least 129,600 individual drawings. In reality, it is possible to achieve a fairly smooth illusion of movement by shooting each drawing twice, thus halving the number of drawings required. And, by using clear sheets of paper called "cels" and overlaying them, it becomes necessary to draw only the part of the image that changes, for example, to draw only the hero if he or she is

moving through a largely static and unchanging background. Nonetheless, Walt Disney's first full-length animated feature, the 1938 *Snow White and the Seven Dwarfs*, required hundreds of staff and a budget of nearly $1.5 million, which was considered a staggering amount then. To accomplish this sort of production requires a systemized division of labor in which people specialize in "key animation," or sequential original pictures that create a visual framework for others to work around; the "in-betweens," the images that fill out the movement; cel painting; backgrounds; photography; music; and so forth. In short, it requires a company, with not only a director and artists, but producers, managers, accountants, and a source of funding.

In June of 1961, Tezuka formed Tezuka Osamu Productions to create animation, and a year later he changed the name to Mushi Productions. The company began with only six people working out of his own home, but it would eventually mushroom to four hundred and revolutionize the animation business in Japan. Tezuka's goal was to create both commercial and experimental animation, using profits from the former to finance the latter. But in the beginning everything would have to be financed by the profits from his manga work.

Work soon commenced on a full-color, thirty-eight-minute-long experimental film titled *Aru machikado no monogatari* (Story of a Certain Street Corner). Conceived, written, scripted, and produced by Tezuka, he intended it to advertise the new company's abilities and emphasize its uniqueness. To that effect, the film was an "anti-Disney" sort of work: a serious, artistic venture with no dialogue and an antiwar story featuring a young girl, a moth, and colorful posters on the street that come alive. Drawn in a modernistic European, rather than American, animation style, the story unfolded entirely with images and classical music.

Yusaku Sakamoto and Eiichi Yamamoto, who were part of

Courtesy, Tezuka Productions

Osamu Tezuka and his staff at the entrance to the new Mushi Productions studio in October 1963. Tezuka is at the bottom far right wearing his beloved beret.

the original team of six in the company, both directed the film. And it is Sakamoto who reportedly came up with the idea of animating Tezuka's *Mighty Atom* for what the staff hoped would be the company's first profit-generating venture. He had previously worked at Tōei Dōga, and for a long time he had dreamed of somehow animating *Mighty Atom*, but no one in Japan had yet tried to create an animated series for TV. So instead, while at Tōei, Sakamoto had once proposed making a series of *Mighty Atom* shorts to be shown along with regular full-length features in theaters. The top people at Tōei mainly turned down his proposal, he claims, because most of them did not yet know who Tezuka was.

After leaving Tōei and joining Tezuka's new start-up company, Sakamoto felt obligated to help come up with a profit-making idea, since he knew that Tezuka was paying his and others' salaries out of his own pocket. Over drinks at a local bar with the other members, he revived his old idea of animating *Mighty*

Atom. Having carefully studied all the American TV animation that was then entering the Japanese market, he was convinced that it could also be made into a TV series. *Mighty Atom*, he felt, was an especially good candidate, not only because it was an already famous property, but because Tezuka's manga stories were so intrinsically interesting, and also because each episode was fairly short and could stand alone independently. If absolutely necessary, Sakamoto reasoned, they could just shoot the images on Tezuka's manga pages and edit them into a program that would be successful, even profitable—almost like creating a TV version of traditional Japanese *kami-shibai*, or "paper plays," wherein a narrator tells a story and illustrates it with a series of hand-drawn panels.* "When I pitched the idea to Tezuka," he said in an interview in 2002, "he must have been thinking along the same lines, because he immediately said, 'Let's do it,' and from that point on we started discussing how to carry out our idea."[40]

The actual implementation of the idea was not to be so easy. As Eiichi Yamamoto notes in his autobiography, *Mushi Puro no kōbōki* (The Rise and Fall of Mushi Productions), no one had ever attempted to make a weekly animation show in Japan. It would require at least twenty-five minutes of film to make a thirty-minute show with commercials. If they used the Disney or Tōei Dōga style of production, they would need a staff of over three thousand animators (who did not even exist in Japan at the time), and their expenses would be so huge they would never be able to make a profit.

As a result, they were forced to adopt a version of Sakamoto's original idea. Instead of "full animation," they would employ "limited animation," which used far fewer drawings than the Disney method. In Japan Tezuka is sometimes said to have

*In 1967 director Nagisa Ōshima would do this with Sanpei Shirato's classic manga, *Ninja bugeichō* (Military Chronicles of a Ninja), shooting the actual pages and merely adding dialogue and music.

invented limited animation, but this is not the case. In reality, it was already in wide use in the United States at companies such as United Productions of America (UPA), which created artistic shorts and the *Mister Magoo* series in the 1950s, and Hanna-Barbera, which would come to dominate American television animation in the sixties with series such as *Huckleberry Hound* (1958) and the *Flintstones* (1960).

The economics of production, however, did force Tezuka and his growing staff to improvise wherever possible, and to push the animators to the limits of human endurance. Instead of consistently using one or two frames of film for every drawing to establish smooth movements, they would occasionally use up to eighteen frames, sometimes even shoot one drawing for up to five seconds, and try to keep the total number of drawings for a whole episode under two thousand, later reducing it to 1,800, even 1,500—and at the extreme, only 900.[41]

On November 5, 1962, Tezuka and his staff held a special screening of *Story of a Certain Street Corner* and a pilot episode of *Mighty Atom* in the Ginza district of Tokyo. The *Atom* pilot was only a little over ten minutes long, but Tezuka added dialogue, sound effects, and music, and it was enough to get the project off the ground. With this, they were able to make a deal with Fuji Television to create an entire series of weekly episodes and to line up Meiji Seika, the giant confectionery manufacturer, as a sponsor. They would create an advance stock of five completed episodes, with the first one to be broadcast on January 1, 1963. Unfortunately, hoping to make the series more competitive and thinking that it would ward off potential competitors, an over-confident Tezuka agreed in his bid to Fuji TV to adhere to a cost and production schedule that bordered on the inhuman. It was a rash act that he would come to regret later.

As Yamamoto describes it, the staff of Mushi Productions was then forced to work against the clock.

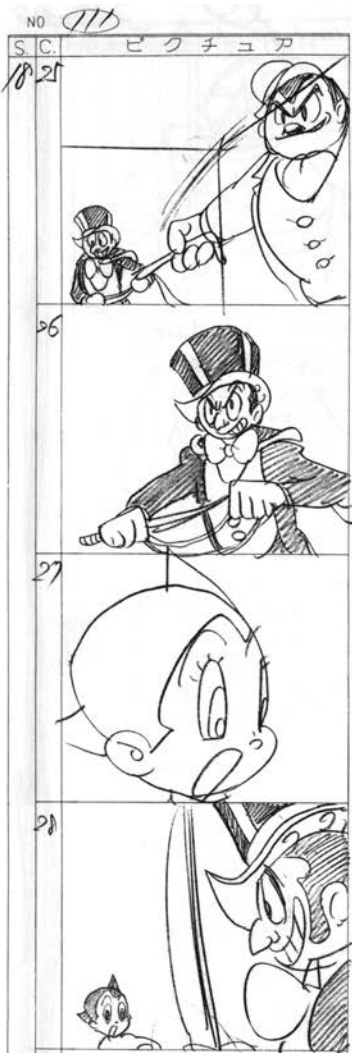
> Everyone gave up their holidays and their Sundays, and worked until the last train went home. Those like me, who were single, found going home late to an empty apartment and getting up early to come to work a pain, so we just continued drawing through the night. . . . Where we held our pencils in our right hands, or where our pinkies rubbed against the paper, the skin started to peel and turn raw, making the drawings bloody, so we had to wear bandages. When hungry we had *ramen* or fried noodles delivered from a neighborhood shop, and when tired we crawled under our desks and went to sleep.[42]

And no one worked harder than Tezuka. His drawing speed was legendary, but now it was really put to the test, for he not only had to work on the animation, but also continue to churn out his usual quota of serialized manga stories. Reflecting on this period, Yusaku Sakamoto recalls being amazed by the fact that Tezuka never seemed to sleep. And while other young men might crave the nightlife or other distractions, Tezuka truly seemed to live for his work. Other animators might have blisters on their hands, but Tezuka's were already covered with *pen-dako*, or the thick calluses caused from long hours of drawing with pens.[43]

❍ ❍ ❍

On January 1, 1963, *Tetsuwan Atomu* aired on Fuji TV as the new channel's first animated TV series, and it was a resounding success, pulling in ratings of 27.4 percent. The first episode was titled "The Birth of Mighty Atom." It was the story of how Dr. Tenma, the temperamental head of the Ministry of Science, created a robot, Atom, as a replacement for his dead son, Tobio; how he sold Atom to the circus because he didn't grow like a real little boy; and how Atom had then been saved from the

circus by Professor Ochanomizu. A woman, Mari Shimizu, provided Atom's voice and proved very popular. There was surprisingly little dialogue, and most of the story was told with images and classical music, including parts of Beethoven's Symphony No. 9. The movement was limited, but the opening scenes were particularly fluid and a variety of tricks were employed to create the illusion of more movement on the screen than actually took place; the opening theme music, with an impossible-to-forget, energized, and uplifting melody by composer Tatsuo Takai also helped. The first animation episode gave Tezuka a unique opportunity to restart and unify his overall *Mighty Atom* story, using the beginning he had developed after the fact by fits and starts in his original manga series. Amazingly (given his schedule), he not only provided the story and the script for the episode, but also drew most of the story-



© *Tezuka Productions. Source:* Tezuka ekonte daizen: Tetsuwan Atomu, *(Tokyo: Kazuide Shobo Shinsha, 1999).*

Continuity sketches by Osamu Tezuka for the 1963 animated Mighty Atom *series. From episode 90, "Robot Fortress."*

Courtesy, Tezuka Productions

Tezuka working on the Mighty Atom *animated TV series circa 1963.*

boards and was in charge of overall direction. He would go on to script and direct several of the next few episodes and be somehow involved in the overall production of the rest. Still, his other manga work (including *Mighty Atom*) made it impossible to continue at the same rate, so he inevitably had to curtail his direct participation.

Broadcasts of the *Mighty Atom* TV series thereafter continued for four more years, until December 31, 1966. In total, there were 193 episodes created, and the eighty-fourth, "Dolphin Civilization," broadcast on August 29, 1964, still holds a ratings record for that week of 40.1 percent.[44] In the beginning, the episodes followed Tezuka's manga quite closely: the second animation episode, "Franken," was the third in the manga series; the third animation episode, "Mission to Mars," was the sixth in the manga series; and so on. As the anime series continued, its popularity continued to grow, and so did the fame of Tezuka.

The *Mighty Atom* episodes were fun and interesting, and unlike American cartoons then showing on Japanese television, such as the *Flintstones* or the *Jetsons*, they were not just gags and slapstick or family sitcoms. Because they were based on Tezuka's manga stories, they retained much of the charm of the originals even if watered down for a broader audience. They had tragedy (people even died), humor, and provocative ideas; in short, they had the strong visual and narrative elements that Tezuka had

exploited so well in his manga, and they created a new, emotive experience in animation. In addition, even if the series was in black and white, and even if the movements were sometimes jerky and limited, the story was by a Japanese, created for Japanese sensibilities, and it was Japan's first TV-animation series. There was, in other words, not only a huge sense of novelty about the program, but also a great deal of national pride. For the end of the series, Tezuka returned to script and direct the last episode, "The Greatest Adventure on Earth," which was shown on December 31, 1966. In it, he permanently killed Atom off (or at least seemed to) by having him fly into a sunspot-ridden sun to save Earth.

❍ ❍ ❍

Without realizing it, Tezuka and Mushi Productions created the template for modern Japanese animation. What had started as a system designed to make animation on the cheap eventually became a challenge and provided a new way of telling a story. Instead of movement and "realism," the emphasis was placed on story, character development, and emotional impact. Eiichi Yamamoto, one of the original six members of Mushi Productions, identifies eight main cost- and timesaving techniques that the staff developed for *Mighty Atom* to make it succeed:

1. Shooting three frames of film for every drawing instead of one or two to create the illusion of fluid movement.
2. Using only one drawing in a *tome*, or "still" shot, when shooting close-ups of a character's face.
3. Zooming in or out on face shots or physically sliding a single drawing under the camera to create the illusion of movement with a single drawing.
4. Shooting a single short sequence of animated drawings

and then repeating it again and again while sliding the background image. This was particularly useful for repetitive movements like walking or running. Six or twelve drawings could thus be used to show a movement as long as necessary.

5. When a character moved an arm or leg, animating only that portion and shooting the rest from one drawing.
6. Animating the mouth alone (rather than using full animation synchronized to the sound) and abbreviating the drawings used, showing only a fully open mouth, a shut mouth, and a partially open mouth to represent characters speaking.
7. Creating a "bank system" of images to save on the total number of drawings, allowing reuse of the same drawings in different situations.
8. Using more short takes in place of single long takes that usually required more movement.

Except for episode number 56, which the staff made in color as an experiment, the whole series was in monochrome. To further economize, they also reduced the usual gradations of paint tone from eleven to seven.[45]

As more and more people at Mushi Productions became involved in making *Mighty Atom* episodes over the four-year-long broadcast, they learned these and other new skills, and applied them to other projects. Tezuka had little direct involvement, but in 1964 Mushi Productions released a color feature-film version of *Mighty Atom* called *Tetsuwan Atomu: Uchū no yūsha* (Mighty Atom, Space Hero). And the company never limited itself to *Mighty Atom*, or even solely to animation based on Tezuka's manga or ideas. For years, it was one of Japan's most creative and productive animation studios, cranking out popu-

lar TV series (including Tezuka's other big hit, *Junguru Taitei*, or "Jungle Emperor") as well as theatrical features, commercial and experimental works, and even erotically-charged animation for adults.

When employees left Mushi Productions they took their know-how to other animation companies, many of which sprouted in the wake of Tezuka's success. To read a list of the people who worked on *Mighty Atom* is therefore to see a cross section of the pioneers of the modern Japanese animation industry. Eiichi Yamamoto and Yusaku Sakamoto directed many other TV or theatrical animation works. Rin Tarō went on to direct now-legendary works such as *Galaxy Express 999* (1979) and *Final Fantasy* (1994), and, in 2001, Osamu Tezuka's own *Metropolis*. Yoshiyuki Tomino, who directed more *Mighty Atom* episodes than anyone else (including the top-rated episode number 84), later went on to create and direct the vast world of *Gundam* robot animation. Even manga artists, some of whom were

Lyrics to the *Mighty Atom* Animation Theme Song

Music by Tatsuo Takai, lyrics by Shuntarō Tanikawa (trans. F. Schodt)

1. Through the sky—la la la—to the distant stars
   Goes Atom, as far as his jets will take him
   The oh-so-gentle—la la la—child of science
   With 100,000 horsepower, it's Mighty Atom.

2. Listen carefully—la la la—and watch out
   That's right, Atom, be on your guard
   The pure-hearted—la la la—child of science
   With his seven powers, there goes Mighty Atom.

3. On the street corner—la la la—or at the bottom of the sea
   There's Atom again, protecting mankind
   The oh-so-cheerful—la la la—child of science
   Everyone's friend, Mighty Atom.

already famous in their own right (or about to become so), were pulled into the production of *Mighty Atom*. Tezuka and Mushi Productions were so busy that they occasionally had to farm out a few episodes to other companies. One such firm, Studio Zero, which produced "The Midoro Swamp," was a company inspired by Mushi Productions and founded by Shin'ichi Suzuki and Tezuka's younger manga compatriots, such as Shōtarō Ishinomori, Jirō Tsunoda, Fujio Akatsuka, Fujiko F. Fujio, and Fujiko Fujio (A).

❍ ❍ ❍

The success of the *Mighty Atom* TV series had other effects as well, for in addition to inspiring others to form animation productions, it made big corporations suddenly aware of the power of the children's market and character-related merchandising.

Merchandise based on manga characters was nothing new in Japan. In fact, as far back as the 1930s, photographs of the prewar manga artist Suihō Tagawa show that his popular *Norakuro* character was being turned into toys and records. But Tezuka was the first manga artist to harness the power of television and license the rights to his creations in the fashion of Walt Disney in the United States, collecting a royalty on all items sold. In doing so, he paved the way for the modern Japanese manga-anime-pop-culture juggernaut, creating a synergy among fans, publishers, broadcasters, and retailers. The more popular the TV animation became, the more manga magazines and books sold, and the more they in turn helped to promote the animation. And the more popular Atom became, the more Atom-related merchandise could also be sold.

In the United States in the 1950s and 1960s, comics and television developed a competitive relationship, ultimately to the detriment of comics (which plunged in sales). In Japan, the opposite was true. The market was soon flooded not only with

more *Mighty Atom* manga books, but also with ancillary items using *Mighty Atom* designs such as candy, stationary, clothes, masks, pencil boxes, tin toy robots, dolls, games, records, shoes, and even children's skis. By today's standards some of these items are of crude and cheap construction, but they are now collector's items, prized for their nostalgic value and carefully cataloged in multiple illustrated books. For each item sold, Tezuka's company of course collected a royalty, and this eventually became such a major business and source of revenue that a special subsidiary had to be created to handle licensing and special publishing projects. *Mighty Atom* was even licensed to the Sankei Atoms baseball team, the uniforms of which were emblazoned with a flying Atom on their sleeves.

Despite all this extraordinary popularity and success, *Mighty Atom* was hardly a highly profitable undertaking for Mushi Productions. To establish himself in the television market and in hopes of creating something of a monopoly in TV animation, Tezuka had initially negotiated a contract with Fuji TV that sold the broadcast rights for each episode at a ridiculously low price. Articles in the Japanese media and Tezuka's own writings give wildly varying estimates, but according to Eiichi Yamamoto, the program sold for approximately ¥750,000, while production costs were estimated to be over ¥2,500,000. Whatever the actual numbers, Tezuka could temporarily offset production losses with the profits of his *manga* and sales of *Mighty Atom* merchandise, but he still needed other sources of income.[46]

And for this, there was one other untapped, potentially huge market: the United States.

5

Go, Go, GO Astro Boy!!

Early March 1963 found Osamu Tezuka at Tokyo's Haneda International Airport, surrounded by a large crowd of Mushi Productions staff, friends, and licensees. They had all come to wish him bon voyage and good luck on a trip to America, to New York City. There, he was scheduled to meet with representatives of NBC Enterprises, a branch of one of America's premier national TV networks, to discuss the sale of his *Mighty Atom* series. He was excited, and a little nervous.

In 1963 travel abroad was still unusual for Japanese, even to the United States, the once mortal enemy which had now become a major trading partner and political ally. Airfares were expensive, the yen was still pegged at ¥360 per dollar, and to protect the economy the government drastically regulated the amount of currency that ordinary Japanese could take with them. In Tezuka's case, not only had he never been overseas before, but because of his experiences in the war and afterward he also had something of a complex about America and Americans. Above and beyond that, his trip was an extremely bold venture,

since no one had ever sold a Japanese animated TV series into the U.S. market before. True to form, he continued drawing in the airport lobby until he boarded the aircraft.

❍ ❍ ❍

Tezuka had anticipated a possible sale to the United States when making the first pilot episode of *Mighty Atom*. In general, he had tried to make the show as culturally neutral as possible. In the scene where Dr. Tenma sells his defective creation—the robot Tobio (later named Atom)—to the circus, Tezuka had made sure that one of the original drawings of Atom's sales contract was in English, not Japanese. The second episode also had an alternate drawing of a soft-drink billboard in the background, written in English. In a newspaper article written three days after the New Year's Day broadcast of the first *Mighty Atom* episode, Tezuka was quoted as saying that he had already had inquiries from overseas.[47]

Around the same time, a Japanese agent who was about to visit New York also contacted Tezuka. A few Japanese animation shorts or features had previously been sold to America, and this man—who represented some other independent and experimental Japanese animators—had an idea. He wanted to borrow a print of *Mighty Atom* to show to some prospective American clients, in hopes of interesting them in an entire series. "America was the real home of TV shows," Tezuka wrote later, "so the idea that Americans would be interested in anything made in Japan with a budget of only ¥500,000 to ¥600,000 seemed like a joke. Nonetheless, a few months later we were contacted by NBC Films, a subsidiary of one of the big three American networks, and after sending them a few samples they told us they were interested in signing a contract with us for fifty-two episodes. I nearly jumped for joy."[48]

By February of 1963 the lawyers had put together a draft

contract giving NBC the option to broadcast fifty-two episodes of *Mighty Atom* for a minimum guarantee of around $520,000. In exchange, Mushi Productions sent copies of negatives, the dialogue script, background music, and sound effects to the United States so that English-language pilots of two episodes could be created by redubbing and mixing.

❍ ❍ ❍

On his first visit to New York, Tezuka did not get a particularly good impression of the city. Later, he would write that when viewed from a distance, the skyscrapers of the city looked like a group of gravestones and "evoked an image of the ultimate end of mechanized civilization." After checking into the Roosevelt Hotel near Times Square, he walked around and also discovered to his surprise that in immigrant-abundant New York, many Americans were shorter than he was, often poor instead of rich, and sometimes had as much or more difficulty than he did in speaking English. It was a revelation for someone who had seen so many American movies and been so inundated with positive media images about America. "It was the first time since the end of the war," he later wrote, "that I was able to rid myself of the complex I had vis-à-vis Americans." After that, the screening of a pilot episode of his film on March 10 in New York was easy.[49]

Tezuka was also proud of the non-financial terms of the contract discussed with NBC Films, particularly the fact that his series was to be kept largely intact and that he and the Mushi Production staff would be given credit. He was painfully aware of what had happened to other Japanese films sold to America on a buyout basis, instead of with a royalty or distribution contract. With a buyout, the creators could get more money up front, but sometimes the American company chopped up the films and reworked the content for American audiences, even leaving the Japanese creators off of the credits. *Saiyūki*, or "Journey to

the West"—the Tōei Dōga film Tezuka had previously worked on—was one of the first Japanese feature animation films exported to the United States, but the Americans had renamed it *Alakazam the Great* and stripped it of its original religious references, making Buddha a "King Amo" and other religious figures mere magicians. This was not to be the case with *Mighty Atom*, for other than the dubbing and editing changes to which Mushi Productions agreed, the series was to be kept essentially intact.

One thing that NBC executives did quickly change for the English version was the title. Instead of *Mighty Atom*—the English translation of *Tetsuwan Atomu*—they chose *Astro Boy*, and the reason for this has been debated for decades among fans of the show. One unconfirmed theory, widely disseminated on the Web in recent years, is that there were contractual issues preventing the use of *Mighty Atom* in the United States because an American comic-book publisher also had a minor superhero character of the same name.

Tezuka had a very different explanation. In his writings, he claims that when he visited New York he was invited to the home of Bill Schmidt, an executive of NBC Enterprises, a man who had great trouble pronouncing the original Japanese title, *Tetsuwan Atomu.* Since Tezuka had used the English title of *Mighty Atom* for graphic effect on his manga as far back as 1951, he hoped that it would be used in the American version of his animation, too. To his surprise, however, Schmidt explained that the film title would have to be changed to *Astro Boy*. When Tezuka inquired why, the executive said that when he had shown it to some businessmen they had burst out laughing at the word "Atom," because in English it meant "to fart." Schmidt said he had therefore asked his young son for a different title, and the son had proposed Astro Boy, which was adopted. It is possible that Schmidt was feeding Tezuka a story,

trying to gently justify a decision he had already made to change the name. Nonetheless, Tezuka believed him, and repeated this story so many times back in Japan that it is now official dogma among Japanese manga and anime fans.[50]

The most authoritative explanation for the name change comes from Fred Ladd—the producer of the English-language series and the man most responsible for its success. Ladd was a young producer and director working in the New York area at the time, and in 1963 he was the one to whom NBC turned to make some English-language pilot films. According to Ladd, NBC's representative in Tokyo had seen an adventure show on television about a little robot boy and thought it might have some potential. Japanese material was extremely rare in the United States in those days, and although none of the NBC people knew any Japanese or could really understand the show, they knew they could pick it up very cheaply. They asked Ladd because he already had a reputation for being able to successfully "localize" foreign (especially European) cartoons—meaning, to dub and reedit them for an English-speaking American market. As Ladd recalls it today, his first reaction after seeing a couple of episodes of *Tetsuwan Atomu* was, "Man, that was LIMITED animation run a-muck! But the sale of *Tetsuwan Atomu* to a circus made me realize the *Pinocchio* connection, and I was tweaked, hooked." He made one pilot, based on the first Japanese episode. NBC saw it and—convinced it would sell—asked him to make another, so he then chose the third episode in the series and turned that into English, too.[51]

At the time, Ladd had been producing another animated feature—directed by Belgian animator Ray Goossens and released in America in 1965—titled *Pinocchio in Outer Space*. A fan of the original *Pinocchio* story, Ladd saw many parallels in *Mighty Atom*, especially in the idea of a mechanical or wooden boy being sold to the circus. But to make an English-language

Courtesy, Tezuka Productions

Osamu Tezuka shaking hands with NBC's William "Bill" Schmidt circa 1963.

pilot, he knew that one of the first things he needed to do was to create a new title that would appeal to both NBC executives and young Americans. The whale in *Pinocchio in Outer Space* was named "Astro." And Ladd remembered that there was also a whale called "Monstro" in Disney's *Pinocchio*, so he thought of using something along those lines. But superheroes with "boy" in their names were also popular in American comics at the time. In discussing potential names with a salesman named Bill Breen from NBC, Breen came up with "Astro Boy," which had an exciting, futuristic connotation, and they both liked it.[52]

Astro Boy was thus adopted as the official title for *Mighty Atom*, and it has remained so ever since outside of Japan. In retrospect, it was a good change and a good title for North America, for it stripped Atom of the direct association with nuclear power that the character had in Japan—an association that might have become more problematic in North America as time went by and the Cold War antinuclear movement began to grow in strength.

Ladd made one other change in the first English pilot film that eventually affected the Japanese version, too. He kept composer Tatsuo Takai's wonderful opening instrumental melody, but had NBC hire an American, Don Rockwell, to create lyrics, which were recorded by a group of energetic young school children singing, "*Crowds will cheer you, you're a hero, as you go, go, GO Astro Boy!!*" This was deemed extremely successful, so much so that Tezuka later did the same thing for the Japanese series.

After his return to Japan, he had slightly less-martial Japanese lyrics created by Shuntarō Tanikawa and recorded by the Kamidakada Boys' Choir. For months, Fuji TV had been airing the series with the instrumental opening, but when they broadcast the new version later that year, viewers loved it. A true classic in Japanese animation theme music was thus born.

❍ ❍ ❍

Ladd later went on to direct and supervise the production of 104 episodes of *Mighty Atom* for the U.S. market, and thus helped lay the foundation for the current *anime* boom in North America. And he did far more than simply translate the Japanese work. He was in the delicate position of having to preserve the integrity of the Japanese original, but also to tweak it to make it acceptable to American audiences, who—in a pre-sushi, pre-futon, and pre-Japanese-autos era—were not accustomed to anything foreign, especially cartoons. To appreciate what Ladd did requires knowing what later happened to other animated series from Japan that were adapted for the American market. Some of them became virtually unrecognizable—the classic example of this being the 1985 TV hit, *Robotech*, which was assembled from three completely unrelated Japanese animation series that were deconstructed, reedited, and turned into one entirely new story.

A fast-thinking and fast-talking man with an extraordinary wit, Ladd rewrote many of the *Mighty Atom* scripts, dubbing the dialogue with American voice talent, inserting zany American gags, and creating a product that would win the hearts of young Americans. He did an especially superb job with many of the character names. The huge-nosed "Professor Ochanomizu," for example, became "Dr. Packadermus J. Elefun." "Tobio" became "Aster" (which then easily became "Astro"). Atom's schoolteacher and amateur sleuth, Higeoyaji (Mustachio), became

"Mr. Pompous." And Inspector Tawashi, whose mustache makes him look like a cleaning brush, became "Inspector Gumshoe." But names were one of the easier aspects of the show to change.

© Mushi Productions/Tezuka Productions/ NBC Films

Opening title scene from the 1963 U.S. Astro Boy *TV series.*

"The hardest part in the production," Ladd says, "was downplaying the violence of the action, explaining and justifying it in terms American kids could understand, and rationalizing cultural differences in general. Long before any episode reached the recording studio, the English version had to pass NBC's 'standards and practices' for show content."[53]

On his first visit to America, Tezuka had noticed that there was a profound difference in the way American and Japanese children were exposed to media. In Japan the borderline between adult culture and that of children has always been somewhat blurred, and children traditionally have been allowed to watch almost anything they want on television, which is often on all day long as background entertainment in living rooms and kitchens. When invited to the house of the general manager of NBC Films and to other middle-class homes, however, Tezuka marveled at how well-behaved American children were, going to their rooms after dinner, studying for the next day, and going to sleep promptly by nine. They "only watch the children's programs on television," he noted with amazement, "and then they switch off the TV all by themselves and hardly ever watch shows for adults."[54]

Since *Mighty Atom* was the first Japanese TV series to be exported to the United States, Tezuka and the Mushi Productions staff had no idea what to expect. When they saw the

localized versions of their work, they soon found themselves puzzling over what seemed to be profound cultural differences. Later, in October 1964, Fred Ladd would visit Tokyo for the first time in order to explain what sort of material could be accepted in the United States by NBC and what could not. It was the week that the Olympics were being held, and Tokyo was bustling with energy, its once battered economy having roared back to life. "Everywhere you looked," he recalls today, "you saw colorful, vertical neon signs, flashy 'Times Square' sort of lights, winking on, off, gazillions of people mobbing the streets at night!"[55]

"It was a tough sell," Ladd says, especially in having to explain to the young Mushi Productions staff that "the list of 'nonos' I was laying on them was because of *cultural differences*, and not because of anything that they were doing 'wrong.'" It was Ladd's first time meeting Tezuka, and he was particularly concerned that the creator would not appreciate having his work tampered with at all. Tezuka, for that matter, was a little wary at first because he wasn't sure why NBC had sent Ladd, but to Ladd's relief he was charming, with a good sense of humor. According to Ladd, Tezuka loved the work, and so greatly appreciated the efforts to preserve his show's integrity that at one point he even called Ladd the "Godfather of Astro Boy."[56]

Later, after Ladd and Tezuka held a press conference in Tokyo's ritzy Ginza area on October 29, it became clear how puzzled the Japanese were by different American standards. The media ran several proud articles on the initial success of *Astro Boy*, but as several magazines noted (somewhat sheepishly), of the initial batch of fifty-two episodes that were licensed to NBC, six had been rejected. The problems included scenes of vivisection, or what appeared to be cruelty to animals, depictions of blacks, references to specific religions or to narcotics, and of course, nudity. The episodes at issue included, for example,

Kirisuto no me (The Eyes of Christ), an early mystery episode where a crucifix on the church wall gives away the bad guys. *Kiiroi uma* (Yellow Horse), a fascinating episode about drug addiction, also didn't make it. Ladd claims that he was eventually able to save three of the six rejected episodes, but even for those that made the first cut, he often had to tweak specific sections to get episodes by the NBC censors. In the very first episode where Atom is sold to the circus, for example, the English-language contract that Tezuka had drawn into the episode in anticipation of an English-language version reportedly did not help, as it evoked associations with slavery. Also, the neon sign over the circus—originally in Japanese—had to be cut. And in another episode, Mustachio's style of Japanese-style squatting had to be eliminated.[57]

A careful comparison of both Japanese and English versions today shows many of the problems that Ladd confronted. He could often resolve cultural differences by tweaking the dialogue, but when that wasn't enough, he had to resort to excision. References to religion were usually eliminated. Scenes with what Americans might regard as having gratuitous or excessive violence were also cut, as were direct visual references to nuclear war, overtly erotic imagery, and most depictions of American minorities. In the process, Atom himself changed: in the Japanese version the young boy robot often used twin machine guns that he had in his fanny, but in the English version these were rarely shown. Many of Tezuka's wackier gags, such as his use of the comic-relief *Hyōtantsugi* gourd character, had to be cut out. Furthermore, to satisfy NBC censors, Ladd used clever editing to make sure that characters in the English edition never died. As he describes it, "If Tetsuwan Atomu knelt over a body in the street and said, 'He's dead,' Astro Boy would say, 'He's unconscious, get him to a hospital!'"[58]

At least one of the problem areas in the original Japanese

version came as a surprise to Tezuka himself. Eiichi Yamamoto, one of the original members of Mushi Productions, describes in his autobiography how Tezuka came back from America somewhat upset because he had discovered that in the second episode there had been a painting of a nude woman on the wall of Atom's house. Yamamoto had to explain that a background painter had put it in as a joke during an all-night stint when he needed something to help him stay awake.[59]

From the beginning, Tezuka had made his *Mighty Atom* manga series quite culturally neutral. In making the early animation episodes, however, he had deliberately tried to anticipate the feelings of foreigners and to avoid any imagery they might regard as too "Oriental" or "exotic." Instead of using Japan's Buddhist or Shinto symbols, for example, he often incorporated Christian motifs such as churches and crosses in stories. Yet to his surprise, this often posed a problem with NBC because of the multi-denominational nature of the American audience and the population of minority religions. Similarly, when making the animated series, Tezuka sometimes tried to take foreign viewers into account, intentionally inserting English words in background scenes or props. To his astonishment, NBC had a problem with this too, because they were afraid that many in the young American audience would not be able to read the text.[60]

But to Tezuka, the most baffling aspect of Americans was their attitude toward violence. One early viewer he met claimed that he couldn't show *Astro Boy* to his children because of the violence, which made Tezuka wonder why animated *Popeye* shorts, which had even *more* slapstick violence, could be so popular. Another American saw Atom/Astro destroying an evil robot and declared the mechanical boy was a "murderer." "In other words," Tezuka wrote, "to him both Atom *and* the robot seemed too humanlike. . . . And having a robot destroy another

robot was therefore just like having a human kill another human. Americans were so sensitive about scenes of violence in fantasy. But they didn't have much trouble going over to South East Asia and killing people."[61]

❍ ❍ ❍

Cultural differences aside, the March negotiations with NBC Enterprises had gone well. In May, NBC Films had signed a contract to exercise its option to distribute fifty-two episodes of *Astro Boy*. And on September 7, 1963, Japan's first TV-animation series thus became the first series from Japan to be broadcast in the United States, debuting on New York's WNEW station. Because NBC is a national network, many people often mistakenly believe that *Astro Boy* was broadcast nationally, but in reality the show was syndicated, which meant that NBC Films sold the right to broadcast the show to individual stations around the United States. Had the show been in color, it probably would have had even broader exposure, but in 1963 the demand for new black-and-white shows was beginning to plummet. Yet even in black and white, *Astro Boy* was a new concept in animation. As a pamphlet made by NBC Films to advertise the series stated in dramatic text next to an image of Astro smashing an evil robot:

> Boy 'O Boy! A robot boy alive as any boy, in 52 animated half hours. Each half hour a full adventure, created especially for syndication. ASTRO BOY—21st Century boy who flies through space, and moves mountains, and is so wondrous an attraction to youngsters and adults alike.[62]

Thanks to Fred Ladd's skillful tweaking, in many local markets *Astro Boy* earned extremely high ratings. NBC Films released an advertisement quoting the February 5, 1964, issue of *Variety* magazine, and under a drawing of Atom zooming

across the sky, a headline blared: "Astro Boy Top Ranked Syndication Show in New York City." For the period of October 17–November 19, 1963, the ratings for *Astro Boy* had beat out other popular American shows such as *Sea Hunt*, *The Mickey Mouse Club*, *Rifleman*, and *Mr. Magoo*. And it was not just New York, for *Astro Boy* did well in other regions too and eventually was shown in dozens of countries around the world.[63]

The show was so successful that in 1964 NBC Enterprises contracted with Mushi Productions and Tezuka to show fifty-two more episodes. The promotional flyer that NBC Films—the distribution arm of the company—created to advertise the next release showed Atom/Astro pondering:

> What do I do for an encore? My series is less than a year old and it's breaking records across the country, like 45% of the TV audience in Atlanta, 38% in Memphis, 37% in Charleston, 30% in New York, 65% in Jackson, and top ratings in many other markets. . . . No time to rest. I'm out for even more fans with my 52 brand new episodes. 104 shows! Maybe I should run for president?[64]

With this success, limited *Astro Boy* merchandise also appeared in the United States. A 78 rpm "Little Golden Record," a format enormously popular then among American children, was released in 1964, the words "TV robot hero of the 21st century" under the title. It included the opening and closing theme song by Takai, performed by the Cosmic Ranger Band, with Don Rockwell's catchy English lyrics warming the hearts of young fans. NBC even licensed an *Astro Boy* comic book, which was published by Gold Key in 1965 with a cover image of Astro slicing through a centipede-like monster. Unfortunately, Tezuka's name did not appear on the cover, nor was his manga or animation artwork used. The artist was an American who referred to the animation rather than the original Japanese

manga. To Tezuka, it was in effect a pirate edition. "Horribly drawn," as he later wrote, the comic book is today a collector's item, selling for hundreds of dollars on eBay.[65]

Many young viewers of the animation were not even aware that they were watching a show from Japan, since Japanese names and cultural oddities had been largely excised from the films. But they were fascinated by the hero, a robot who looked like a little human boy and fought for peace and justice. The structure of the show seemed familiar, but at the same time it was utterly different from anything else on TV at the time. Tezuka went on to create many other animated series, some of which, like Japan's first color animation TV series, *Janguru Taitei* (Jungle Emperor, or *Kimba the White Lion*), were also successfully exported to the United States. But today Astro Boy is arguably one of the most widely recognized Japanese animation characters of all time, even by people who never saw the original TV series. In the United States, Astro Boy also had a special "kitsch" quality to him; a sort of a quirky, campy appeal that sometimes leads grown-up artists and musicians forty years later to include references to him in their works as a way of establishing a type of "cool." Astro's iconic popularity stemmed partly from the clean, simple lines of his design and the fact that he was really a robot, but it was clearly more than that. Of the original series, producer Fred Ladd said in 1993:

> It succeeded for many of the same reasons *Pinocchio* succeeded and *Home Alone* succeeded—there's an empowered youngster outperforming the adult bad guys. Also, in the 1960s, the program was unique on TV; there was nothing else like it on the air. Tezuka was a true visionary, who correctly perceived that robots would displace many human beings in our society, and that this would lead to a strained relationship between man and robot.

> And the man had, and understood, humor. Today, the ten-year-olds who watched *Astro Boy* thirty years ago are forty-year-olds with their own ten-year-old children. For them the program has dear, nostalgic values. They watch the videos together, and each generation derives its own values out of the experience.[66]

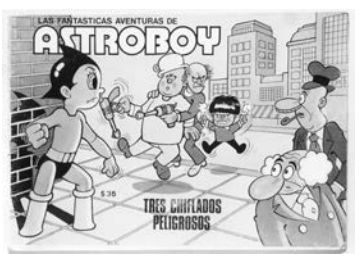
❍ ❍ ❍

During his lifetime, Tezuka never achieved an iota of the fame overseas that he had within Japan. Nonetheless, the success of the English-language *Astro Boy* gave him a taste of international glory and greatly raised his stock within Japan, where, especially after the defeat of World War II, any positive international recognition resulted in national elation. Reflecting the emphasis Japan placed on increasing exports to offset its lack of raw materials, many of the newspapers ran headlines proclaiming *Mighty Atom* (aka *Astro Boy*) to be a powerful new earner of foreign capital. It was of course only one of Tezuka's many popular manga works, and only one of many animation series he would later create, but at the beginning of 1964, an association of TV reporters in Japan gave *Mighty Atom* an award, and the next year so too did the Ministry of Health and Welfare.[67]

Astro Boy also brought Tezuka another moment of personal glory when he visited New York for the second time, in April of 1964. In addition to representing himself, he was also on assignment as a "reporter" for the *Sankei* newspaper, covering the New York World's Fair, then the largest world's fair ever held in the United States. As he later delighted in telling the story, in conversations and in his writings, this is where he met Walt Disney, whom he idolized and dreamed of one day equaling, even surpassing, in the world of animation.

In 1964 Walt Disney was already grey, wizened, and slightly stooped, and he would pass away only two years later, but his

company was responsible for the design of four pavilions at the fair that showcased Disney's new "audio-animatronics" technology. Later used extensively throughout Disneyland and Disney World, audio-animatronics made possible, among other things, a lifelike talking Abraham Lincoln robot, realistically moving dinosaurs, and various other moving figures. Unlike Tezuka, at this point in his life Walt Disney was more of a businessman and entrepreneur than an artist, and the Disney style of animation films was coming in for criticism in the industry for being stale and too formulaic. But to Tezuka, Disney was still a hero.



Courtesy, Tezuka Productions

Astro Boy *comics based on the 1963 TV series, released in the U.S. and Latin America, drawn by artists other than Tezuka and not authorized by him.*

The Pepsi-Cola pavilion was one of the most popular at the 1964 fair, and it showcased the Disney-designed "Small World," in which hundreds of cute dancing dolls gyrated and swung to one of the world's most diabolically unforgettable songs. As Tezuka watched in amazement, Disney addressed an adoring audience of hundreds at the pavilion. Later, Tezuka drew cartoons of the event, showing Disney with a halo around his head, or being treated like royalty.

After Disney finished talking, Tezuka ran into him in the audience. As nervous and tongue-tied as a young fan, he managed to introduce himself as the head of an animation studio in Japan. Disney apparently replied with a disinterested pleasantry, but when Tezuka mentioned that he was the creator of *Astro Boy*, it pricked Disney's interest; he had seen it in Los Angeles, he said, and thought it was a wonderful show, a fascinating example of a story with a science theme. "Kids are going to be focused more and more on space in the future," Disney supposedly said, "so that's the sort of thing I'd like to make myself someday."[68] Sometimes, in conversation, Tezuka would later embellish this story a bit and have Disney say that he "wished *he* had made Astro Boy."

Astro Boy also gave Tezuka other, more indirect bragging rights as an artist. Some years after *Astro Boy* was broadcast around the world, Tezuka received a letter from Stanley Kubrick, the film director already famous at the time for *Lolita*, *Spartacus*, and *Dr. Strangelove*. In the letter, Kubrick reportedly said that he had been very impressed by *Astro Boy* and, after having obtained Tezuka's address from NBC Films, was writing to inquire if Tezuka would be interested in helping on the art direction or design of a new, very realistic science fiction that he, Kubrick, planned to make. Since it would have required living in London for a year or two, and since Tezuka was far too busy with his own manga and animation, he had to turn down the offer. But as a Kubrick fan, he was extremely flattered—especially when he later saw the completed work, *2001: A Space Odyssey*, released in 1969.[69]

Yet another, even more indirect and complicated compliment seemed to come from the 1966 science-fiction movie, *Fantastic Voyage*, directed by Richard Fleischer and released by Twentieth Century Fox. It was the story of a team of humans shrunk to a tiny size and injected into the blood system of a

comatose scientist in an effort to remove a clot in his brain. As Tezuka tells it, after *Astro Boy* aired in America, a producer at Fox named E. Wellner contacted NBC wanting to know the copyright status of a particular episode in *Astro Boy* because Fox was interested in using it for a new science-fiction film. NBC gave the producer the information requested along with Tezuka's address, and notified Tezuka to that effect. No contact ever came from Fox, however, and when Tezuka saw the final film he felt that he had been plagiarized, that he had "been had." Although impossible to prove, in Japan today it is widely believed that *Fantastic Voyage* is based on Tezuka's 1964 *Mighty Atom* animation episode, *Saikin butai*, broadcast in America as the "Mighty Microbe Army."[70]

© Tezuka Productions

Tezuka's recollection of seeing Walt Disney at the 1964 New York World's Fair, drawn for Sawayaka *magazine, vol. 135, December 1981.*

Above all, what pleased Tezuka was the fact that wherever he went in the world, even if children did not know his name, they knew of "Astro Boy."

❍ ❍ ❍

The original black-and-white *Astro Boy* films, while the stuff of legend today, did not last long in the United States. In part because American television was switching to color programming, NBC chose not to purchase more than 104 episodes. As a result, although broadcasts continued in Japan and Tezuka was

still drawing *Mighty Atom* manga, by 1965 most American stations had ceased airing the show.

Back in Japan, Tezuka continued working, drawing other hit manga series, often animating them with Mushi Productions. He turned his *Janguru Taitei* (Jungle Emperor) manga into Japan's first color TV-animation series. Like *Mighty Atom*, it was localized for the American market by Fred Ladd and distributed in the U.S. by NBC Films starting in 1966. And Mushi Productions kept churning out more and more animated works as both TV series and theatrical features, for both children and adults. Many of these works, but not all, were based on Tezuka's manga, yet the pioneering organization had begun to spin out of Tezuka's control. Revenues were high, but there were too many employees, too many expenses, and not enough profit. Debts began piling up, especially with the subsidiary company formed to handle licensing and publishing. In 1968, to offset ¥150 million in loans, all rights to ten animated films, including *Mighty Atom*, were turned over to Fuji TV for a period of ten years. In 1971, shortly after 119 employees formed a union, Tezuka resigned as president. In 1973 the company crashed into bankruptcy, and the rights to the films thereafter entered a legal limbo mess that was not fully resolved until the late 1990s. A "new Mushi Productions" was formed in 1977, but Tezuka was not involved.[71]

Meanwhile, in the United States, after NBC's license to the *Astro Boy* films expired, it tried to return the master prints to Japan. According to Fred Ladd, Mushi Productions, being in bankruptcy, could not accept charges for the shipping, nor could Fuji TV. Around 1975, acting on a suggestion by Fuji TV, NBC therefore destroyed all the original *Astro Boy* prints.

❍ ❍ ❍

Through this experience, Tezuka realized that he was primarily

a creator and not a businessman like Walt Disney. He concentrated on creating manga, but he was never able to relinquish the dream of producing animation. After having extricated himself from debt, he quickly began using the company he had originally formed to create manga, Tezuka Productions, to also create TV, theatrical, and experimental animation again, and continued to do so until his death in 1989. In 1980, he created a new fifty-two-episode color version of *Mighty Atom*, which was broadcast in Japan and sold for limited distribution overseas.

In the United States, a Japanese national took advantage of the legal mess created by the collapse of Mushi Productions in Japan and, with a dubious claim to ownership, began selling the rights to the English versions of animated Tezuka works such as

English Lyrics to the 1963 *Astro Boy* Animation Theme Song

Music by Tatsuo Takai, English lyrics by Don Rockwell

There you go Astro Boy,
On your flight into space.
Rocket high, through the sky,
More adventures soon you will make.
Astro Boy bombs away,
On your mission today.
There's a count-down, and a blast-off,
Every day is GO Astro Boy!
Astro Boy as you fly,
Strange new worlds you will spy.
Atom sound, jet propelled,
Fighting monsters high in the sky.
Astro Boy there you go,
Will you fight friend or foe?
Cosmic Ranger, life of danger,
Every day is GO Astro Boy!
Crowds will cheer you,
You're our hero,
As you go, go, GO Astro Boy!!

Astro Boy. This resulted, among other things, in the publication of Now Comics' *The Original Astro Boy* in 1987, drawn by Ken Steacy and based on the 1963 *Astro Boy* TV series. For a while, Tezuka appeared to have completely lost control of all rights in the United States, not only to the animated films, but to his world-famous character, and even the ability to use the name *Astro Boy*.

In the late 1990s, Japanese and American courts finally clarified the situation, allowing Tezuka Productions and the new Mushi Productions to reassert full control over the *Mighty Atom* property, and to market and exploit the name *Astro Boy* both in Japan and overseas, including the United States. It was this legal resolution that led to the revival of *Astro Boy/Tetsuwan Atomu* in 2003, and the production of yet another animated series and vast amounts of merchandise.

As for the original *Astro Boy* show, there has always been a diehard core of fans in the United States. One collector, Todd Ferson, in particular, spent years tracking down old films and videos, both on-air prints and internegatives, and when he later formed an Iowa-based company called Right Stuf International, his collection became the basis for a commercial product. The current president of the company, Shawne Kleckner, describes the laborious restoration process embarked upon with an Australian company called Madman Entertainment:

> Poor-quality video was used to match the Japanese release, and the show was basically reedited in the computer to match the splice edits made in the 1960s. Then the English audio was resynched to the restored video. Instead of trying to clean up the video side of the 16 mm prints, as is done in most film-restoration projects, we had access to pristine negatives, although they didn't match due to the edits made. It really turned out quite well.[72]

The result in 2006 was an *Astro Boy Ultra Collector's Edition* boxed DVD set, with all 104 of the Fred Ladd and NBC–produced episodes of the original *Astro Boy* series—officially licensed by both Tezuka Productions and the new Mushi Productions in Japan, and containing at least one episode that had even been long lost in Japan. Reflecting the deep nostalgia among baby boomers for the work and the current boom in *anime* in North America, it was reviewed in the *New York Times* under the headline of "*Astro Boy*, in Glorious Black and White": "Even after all these years, the first lines of the 'Astro Boy' theme song are hard to resist. . . . It's a rare chance to watch the series that started the artistic explosion that became anime."[73]

6 An Interface between Man and Robot

Japan today is known as the "Robot Kingdom" for the huge number of industrial robots working in its factories, for the aggressive research being done in its labs on humanoid robots, and for the hundreds of robot-themed manga and anime films its artists create and export to the world. There is, arguably, no other nation where robots—whether real or imaginary—have been so enthusiastically embraced. In this context Mighty Atom has always functioned as far more than an ordinary cartoon character. Over the years, Atom has become a symbol of state-of-the-art Japanese technology.

When Tezuka first created Atom in 1951, any sort of Japanese robot seemed like a wild dream. This was especially true because, after the defeat of World War II, Japanese technology was regarded not as advanced, but as terribly backward. Nearly everyone agreed. The Shōwa emperor, in a letter to the young crown prince at the end of World War II, bared his soul and wrote that Japan had lost the war because of overconfidence, and because "our armed forces put too much empha-

sis on the spiritual side and forgot science." Japan was so poor at the beginning of the 1950s that Tezuka, still working as a medical intern, found that most of the patients he was treating were suffering from malnutrition. "I realized very clearly," he commented much later, "that Japan lost the war because of science and technology. . . . While the U.S. was dropping atomic bombs, the Japanese military were trying to light forest fires in America by sending incendiary balloons made of bamboo and paper over on the jet streams. We developed an inferiority complex about science." It was all the more reason that, in 1951, what was billed as a "science manga" would fire the imagination of young Japanese readers.[74]

Tezuka often incorporated scientific ideas—at least pseudo-scientific ideas—into all of his manga during his career, even if the manga were complete fantasies. As a physician by training, it was something that he was very good at, and something that he loved to do. Usually there was a medical connection, especially if the protagonists of the stories were humans, but with *Mighty Atom* he also had a chance to play with ideas related to artificial intelligence and what the Japanese today call *mechatronics*, or a combination of electronics and mechanical engineering. *Mighty Atom* was science fiction created in 1951 but set at the beginning of the twenty-first century, so when Tezuka first established Atom's design and technological capabilities in the early fifties, he had to think far into the future. He also had to supply readers with some sort of imaginary "timeline," giving the technological context and background for Atom's creation.

❍ ❍ ❍

In *Mighty Atom*, Tezuka postulated that robots began to appear in society in the 1950s, but that they had been crude machines, inhuman in appearance, and that it had taken far too many of them to accomplish most tasks. This idea adhered closely to real

© 1999 Tezuka Productions

Atom: "Here we are in the Department of Precision Machinery, at the Ministry of Science. It's where I was born." From the 1952 "Gas People" in the Sunday Comics edition of Tetsuwan Atomu, *vol. 15.*

history, since the first patent for an "industrial robot" was filed in 1954 by American George Devol, but when first produced, the industrial robots were little more than programmable, maneuverable machine tools. In the factories of the world today, they remain so.

The timeline thereafter deviated from reality. In 1974, Tezuka imagined, a miniature computer had been invented that ran on atomic power. In 1978, a Professor C. Wakuchia, of Apache Indian descent, invented the first true electro-brain. In Japan, a Professor "Sarumane" copied and improved upon the design, and in 1982 electro-brains were used in the first metal-based, humanoid robot. There was a typical Tezuka joke involved in this last supposition, because *sarumane* in Japanese means "copycat," (literally, "monkey-see-monkey-do"), and in the postwar period, Japanese scientists often had to fight against a widespread belief—both at home and abroad—that they were incapable of original thinking. By 1987, according to Tezuka's timeline, a Professor James Dalton had invented an artificial skin, which was applied to a robot, resulting in the first true "humanoid robot." True humanoid robots thereafter rapidly diffused throughout society.[75]

By the 1990s, American-made disposable humanoid industrial robots had become increasingly popular. There were two types, "A" (crude worker robots) and "B" (suit-clad, intelligent, and designed to control the "A" types) and they were sold as a set. Nations also competed with each other on robot technology, and began to hide their technology from each other, even preventing their advanced robots from going overseas. By the beginning of the twenty-first century, robots had become so advanced that they were talking, laughing, and even getting angry, just like humans. In Japan, nearly five thousand robots were being produced at the Ministry of Science, living and working among humans, some even going to school with them. And

then, on April 7, 2003 (or some variant thereof), Mighty Atom came into being—created, as we have seen, by Dr. Tenma, the eccentric head of the Ministry of Science, in a massive two-year project to replace his dead son, Tobio.[76]

❍ ❍ ❍

From the beginning, Atom was an extremely sophisticated robot, a technological work of art and, as the theme song in the animated series later reminded viewers every week, a "child of science" with "seven special powers." The exact nature of these powers tended to change somewhat over the years (and varied considerably in the animated films). Yet unlike American superheroes, who usually depended on some sort of mystical explanation of their powers, Atom's powers were always grounded in real semi-science. Atom was, after all, a little boy robot, operating on real—or what at least seemed to children to be very real—mechanical principles. At around 4 feet 6 inches tall and 67 lbs, he had approximately the same height and weight as his fellow human schoolmates, but he also had a 100,000 hp atomic engine and retractable jets in his feet and his hands. As a result, he could fly through the air (and underwater), and easily heft cars and smash bigger robots. Moreover, he had a computer brain located not in his head, but in his chest near his atomic engine. This, along with a translation device in his throat, allowed him to understand and speak sixty languages, to tell whether people were "bad" or "good," and (in a way guaranteed to impress young readers in the pre-calculator era) to solve the most complex mathematical problems in under a second. In addition, he could use his eyes as searchlights and, by pressing a button on his ears, increase his hearing one thousand times. To top it off, he had twin machine guns in his fanny, which he used to great effect when battling bigger robots. As the story developed over the years, Tezuka also occasionally added more high-tech

capabilities, including such gizmos as a GPS-like "synchronometer," which occasionally helped Professor Ochanomizu track Mighty Atom, or an "Omega" radar device that helped summon him when he was out of normal range.

On the other hand, Atom had real limitations. He had to be careful not to run out of fuel, and periodically needed Professor Ochanomizu to refuel him using a special tube inserted into his rear end (or sometimes through a hatch in his chest, where he also had a fuel gauge). As a machine, he wasn't particularly good at the subjective disciplines at which humans excel, like art. And unlike normal children, he was unable to cry until he had his surrogate father, Professor Ochanomizu, tweak his construction so that he could shed rivers of tears. He was, however, capable of perspiring, for beads of sweat would sometimes form on his brow when he was tense or in a fix,

© Tezuka Productions

An early schematic of Mighty Atom created by Tezuka to be used as cover art on a Shōnen *magazine "furoku" (supplement) of April 1964.*

but no one ever gave a mechanical explanation for this. Also, as a robot, unless he was rewired he normally never experienced fear or true love, but one of his most endearing charms—and one of the things he perpetually agonized over—was his own robot-nature, because he was so close to humans and yet so far apart. When fed cakes, he would put them in his mouth and swallow them, but they would wind up in a hatch in his chest and he would later have to take them out and throw them away. And, since he was a machine, he sometimes broke down and had to be repaired. In fact, during the long years of the story's serialization, Atom was sometimes thoroughly smashed, but since he was a machine Professor Ochanomizu or another qualified person merely had to fix him. Atom's head was presumably always crammed full of electronics, but in the early *Ambassador Atom* stories he once took off his head and presented it to some aliens as a gesture of sincerity, apparently suffering few ill effects.

As Tezuka was often fond of noting, when he first began drawing *Mighty Atom* there were no televisions in Japan, or space satellites, or astronauts, or much of the advanced technology and gadgetry he depicted. He set his story far enough into the future that most of the technology still seems very advanced. But in reading the manga stories there are some striking exceptions. Tezuka apparently did not anticipate cell phones, and Atom is often shown using an old-fashioned rotary dial-phone. And even while Tezuka was still serializing the stories, young readers began to put him on the spot. In 1965, fifteen years into the series, he wrote that in many cases what had once been dreams "have become reality, so that I should really redraw many things. To children who read *Mighty Atom* these days, moon rockets and computers are taken for granted, to the point that some of them tell me, 'Hey, it's behind the times to use vacuum tubes in Atom's electro-brain; nowadays computers use transistors and diodes!'"[77]

This competition with real-world technology also manifested itself in Atom's internal design. Sometimes in magazines Tezuka drew Atom in cross section, as a schematic drawing, to illustrate his little robot's "advanced" technological features. In the beginning, Atom's body was rather sparsely populated with parts, but as time went by Tezuka drew Atom in increasing detail, as a maze of wires and circuitry. In the eighties, when a large manufacturer licensed Atom's image to advertise the company's state-of-the-art technology, Tezuka showed the little boy robot's innards crammed with semiconductors and the latest mechatronic gadgetry.

❍ ❍ ❍

True robots always have a mechanical and a software component, but in the original *Mighty Atom* manga, Tezuka never mentions any software that might have controlled Atom's super-advanced computer brain. In reality, the word "software" did not come into general usage until the late sixties, long after Tezuka had created his story, but Atom nonetheless clearly possessed extremely advanced artificial intelligence, or "A.I."

In 1950, real-world scientist Alvin Turing came up with what is today popularly known as the "Turing Test" to evaluate how humanlike a computer or robot is. In this test, a computer (ideally with advanced speech recognition and generation capabilities) and a human are both hidden from view behind a screen. A human in front of the screen then communicates with both the unseen real and artificial "humans," and tries to decide which is the human and which is the machine. If the judge cannot tell the difference, the machine presumably has true human intelligence.

Atom may not have had any clearly defined "software," but he would have passed the Turing Test with flying colors, as in story after story he is shown being capable (when he wants

to) of interacting with humans on a nearly equal level. One of the best examples of this is the manga episode, "Yellow Horse," created in 1956. In it, Tezuka imagines that many people in Japan have become addicted to a potent narcotic known as "Yellow Horse," which makes them dance crazily. Atom volunteers to help investigate the gang selling the drugs, and in order to do so he has to not only masquerade as a human, but as an addict. Since he is really a robot, he can't truly understand why humans would become addicted to drugs, but to infiltrate the gang he must pretend to feel both intense pleasure from the drug and pain from injecting it. He successfully fools the gang members in both action and speech, and they only become suspicious when they take an X-ray of his body and see that he has no human skeleton.

As a robot, Atom was also "programmed" to behave in certain ways. The English word "robot" comes from Czech playwright Karel Čapek's 1921 *R.U.R. (Rossum's Universal Robots)*, about "artificial people," or workers who eventually revolt against their human masters. This drama followed in the tradition of the European and Jewish stories of golems, or clay-like creatures, and even the story of Frankenstein. And it contributed to a dark and pessimistic image of robots from which the West has never completely recovered. *R.U.R.* was performed in Tokyo in 1924, but Japan is a largely Buddhist and animistic nation, and the Western Judeo-Christian fears associated with artificial life never really seemed to take root.

Tezuka claims that as a youth the robot stories that influenced him most were a translated copy of *R.U.R.* he read in 1938 and the prewar works of a Japanese science-fiction novelist named Jūza Unno (1897–1947). Unno, called the "father of Japanese science fiction," worked in an electronics lab in the prewar Communications Ministry and wrote novels on the side, many of which had robot characters used as weapons in wars,

sometimes with the Chinese. He, in turn, may have been influenced not only by *R.U.R.*, but by *Metropolis*, a famous 1927 German film with an evil robot character named Maria, which also played in Japan.[78]

Given these dark influences, Tezuka's *Mighty Atom* had an extremely humanistic and original bent. In a 1986 article in the *Journal of the Robotics Society of Japan*, Tezuka explained that he created Atom to be a type of twenty-first-century "reverse Pinocchio," a nearly perfect robot who strove to become more human, and hence, more flawed (i.e., emotive and illogical), and also to be an interface between two different cultures—that of man and machine.[79]

In Tezuka's essential story line for the *Mighty Atom* series, all robots had to obey a set of "laws." There was a famous precedent for this, in the elegantly written "Three Laws of Robotics" crafted by the famous American science-fiction writer, Isaac Asimov in 1942. Asimov's "laws" have become a sort of gold standard for the control parameters of intelligent robots, in science fiction today and, perhaps, in the future real world. To ensure that robots will always operate in a safe manner vis-à-vis humans, the laws stipulate the following:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.[80]

Tezuka always adamantly denied that he had been inspired by Asimov's Three Laws of Robotics, but the laws he came

up with did bear a certain resemblance. There were ten laws in his list, and they covered the principles of Asimov's three, and added seven others with a distinctly manga-esque quality. Among these were the ideas that "Robots can make anything, except money," "Robots shall never go abroad without permission," "Robots shall never assemble other robots that have been scrapped by humans," and "Robots created as adults shall never act as children."[81] Whatever the true source of his inspiration, like Asimov, Tezuka worked hard to counter the "evil" image of metal men in the West, and as a result his creation—Mighty Atom—became a friend of man who lived according to strict rules of robot behavior.

❍ ❍ ❍

When Tezuka created Atom in 1951, the currently popular term "*robotto*" had not fully entered the Japanese language; instead, most people referred to such creations as *jinzō ningen*, or "arti-

Osamu Tezuka's Ten Principles of Robot Law in the Atom Series

1. Robots are created to serve mankind.
2. Robots shall never injure or kill humans.
3. Robots shall call the human that creates them "father."
4. Robots can make anything, except money.
5. Robots shall never go abroad without permission.
6. Male and female robots shall never change roles.
7. Robots shall never change their appearance or assume another identity without permission.
8. Robots created as adults shall never act as children.
9. Robots shall never assemble other robots that have been scrapped by humans.
10. Robots shall never damage human homes or tools.

SOURCE: Mushi Productions, *Mushi purodakushon shiryōshū, 1962–73*

ficial humans." Nomenclature aside, however, Atom was hardly Japan's first fictional robot. As early as 1929, prewar children's cartoonist Suihō Tagawa had a robot character named "Gamu" in his series, *Jinzō ningen*. And one of the most popular manga works of the prewar period was *Tanku Takurō*, starring a hero of the same name and created by artist Masaki Sakamoto in 1934. A pseudo-robot, Tanku had a human head on top of a cast-iron body that looked like a bowling ball with eight holes. He operated on what seemed to be magic, and readers never knew what he would pull out of the holes in his body: sometimes he waved swords or guns, at other times he sprouted wings and a propeller and transformed into an airplane, or even a tank. He was drawn in a naïve style and given an endearing personality, and when he fought he was always on the side of good (Japan). Often he was involved in wars, which reflected the climate of the times. In 1939 both Sakamoto and Tanku moved to the puppet state of Manchuria, where Sakamoto worked for the "Manchuria Development Agency" as a cartoonist and Tanku appeared in a local newspaper.[82]

Like the European stories of the wooden Pinocchio or the clay-based Jewish golems, or even Čapek's robots, prewar Japanese fantasy-robots usually operated without much regard for any real or even pseudo-scientific principles. There was one minor exception, however, and that was the side-character Peli, created by manga artist Fukujirō Yokoi, in his 1946–49 sci-fi series, *Fushigi no kuni no Putchā* (Putchā in Wonderland). Peli, which Tezuka's sister claims was a big inspiration for Atom, was a young boy robot of around ten years old, created to replace a woman's dead son. It was never exactly clear how Peli operated or what sort of technologies powered him, but like Atom, he did have "100,000 horsepower."

Shortly after Tezuka created his Atom character, he faced stiff competition from another popular fantasy robot character.

Photo © 1986 Frederik L. Schodt

Bicycle with Iron Man No. 28 *(*Gigantor*) design, on the streets of Tokyo in the late 1980s.*

In 1956, Mitsuteru Yokoyama began serializing *Tetsujin 28 gō* (Iron Man No. 28), which appeared in *Shōnen* manga magazine. There was an irony in this because in the same year, when Tezuka was in a pinch with an episode of *Mighty Atom* titled "The Midoro Swamp," Yokoyama even helped to draw some of the scenes. Be that as it may, Yokoyama went on to become one of Tezuka's greatest rivals, his Iron Man character at times nearly eclipsing Atom in popularity. Iron Man could fly through the air (with rockets on his back), but he was actually a step backwards technologically. A giant metal monster (eventually 20 meters tall and weighing 25.08 tons), his main power was his brute strength, used in the form of kicks and punches in fights. And instead of being an autonomous android endowed with artificial intelligence, he was operated by a remote control device. Usually this was in the hands of Shōtarō Kaneda, a young boy "private detective," who used Iron Man to foil nefarious criminals of various sorts, but if the device were stolen, Iron Man could be employed for evil ends as well. He was, in a sense, much closer to today's industrial robots than Atom: he was neither good nor bad; he was only a machine.

In 1982, in a magazine called *Robotopia: The Magazine for Man & Robot Relations*, artist Yokoyama explained how he conceived Iron Man. He says three things influenced him in his youth:

> One was the sight I saw when the war ended and I returned to Kobe [his home city] from my rural evacuation site. Everything as far as I could see had been transformed into scorched earth and piles of rubble. . . . I was . . . stunned by the destructive power of war. Second was the V1 and V2 missiles that the German Nazis developed; I had heard that Hitler tried to use them as an ace in the hole to reverse his waning fortunes. The third influence was from the American movie *Frankenstein*.[83]

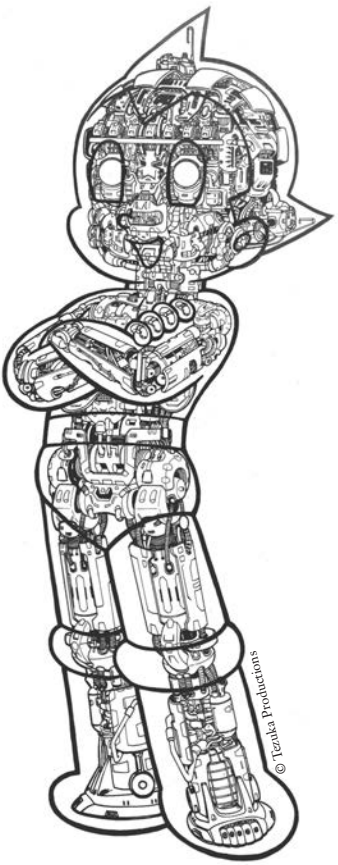
In Yokoyama's story, Iron Man was given the number "twenty-eight" because, like the V1 and V2 rockets, he had originally been designed by the Japanese military as a last-ditch secret weapon to reverse their sinking fortunes. All the models up to No. 28—and up to the end of the war—were failures, however, so Iron Man No. 28 became a civilian robot. It is hard to imagine a robot more different than the humanistic, "family-oriented" Atom, but both characters resembled each other in that they were used to help man, and both have competed for fans until this day. Like Atom, Iron Man No. 28 was serialized for years in comic magazines and was turned into toys, picture books, records, radio shows, and animated for television. Exported to the United States and localized by Fred Ladd, Iron Man No. 28 was shown on American TV under the name of *Gigantor*.

Atom and Iron Man are the progenitors of all subsequent Japanese fantasy robots, and specifically of two distinct genres in existence today—truly autonomous robots and those that require human intervention for their operation. There is usually a lineage in fantasy characters, just as there is with real-life humans, and Atom is the father of nearly all other autonomous robot heroes that later emerged in Japan. The most successful of such characters are usually cute, endearing, and often amusingly error-prone robots, such as the little android girl, Arare-chan, or the robot cat, Doraemon, both of which were popular manga

and animated works. Iron Man No. 28, on the other hand, can be seen as the beginning of a long line of more serious, action-oriented fantasy robot characters. These include the immensely popular giant warrior robots from such famous manga series as Gō Nagai's 1969 *Mazinger Z*, or the "mobile suits" of the vast *Star Wars*–like *Gundam* franchise, first created in 1979 by anime director Yoshiyuki Tomino (who had also directed many early *Mighty Atom* animation episodes).

Over the years in his *Mighty Atom* series, Tezuka introduced scores of fanciful robot characters, both good and evil, in nearly every imaginable shape and size, to act as foils for Atom. In the process he often hinted at the shape of robots to come in future Japanese fantasy. In the 1953 manga episode of *Mighty Atom* titled "Mission to Mars," for example, he envisioned robots that could be operated by humans (or other robots) inside them, but never really developed the idea. Gō Nagai, in his *Mazinger Z*, however, thought that it would be "interesting to have a robot that you could drive, like a car." This helped firmly establish the pilotable, giant warrior robot phenomenon that subsequently captured the imagination of boys all around the world, additional examples being *Gundam*, *Transformers*, and countless other anime shows, many little more than long-running commercials for origami-like transforming, combining, and snap-to-fit toys. The vast majority of robot-themed anime in Japan today follow in the tradition of *Iron Man No. 28*, *Mazinger Z*, or *Gundam*, and are thus "robots" that require remote-control intervention by humans, or actual human "pilots." The secret of these robots' popularity is in the man-machine symbiosis and the fact that it is far easier for young male audiences to relate to a fantasy machine that they can pretend to directly control or pilot, rather than to an intelligent, autonomous, humanoid robot. This is especially true if the pilotable fantasy machine has vast destructive powers.[84]

In truth, however, the most popular of these giant warrior robot shows in Japan do not really feature robots. The "robots" they portray are really exoskeletons, or machines that augment human strength in some fashion. Without a human pilot or controller, they are just hunks of unintelligent metal. It was something that Tezuka, during the decades of drawing or animating *Mighty Atom*, was acutely aware of, especially as stories by other younger artists starring giant warrior robots increasingly grabbed the limelight. In 1985 he wrote, "Children these days think that characters like Gundam are robots, but they are really just automatic machines. They're just tools, like giant power shovels at factory sites. To me, a real robot is something equipped to perform at least five or six different functions on its own, and it consciously chooses which to use as it operates."[85]



Modernized schematic of Mighty Atom's innards from the 1980s created for advertising purposes.

If the real stars of giant warrior "robot" shows are not machines but humans, then for works like *Mighty Atom* the true challenge becomes creating the perfect balance between man

© Kobunsha/Tezuka Productions

Cover to a 1965 special edition of a Kappa Comics Mighty Atom *paperback showing Atom explaining "the science of robots."*

and machine, because the autonomous robot character is supposed to be the star. If a robot character is too machinelike, young readers or viewers cannot identify with it. If the character is too humanlike, it ceases to be a mere robot, and may even be threatening to humans. In *Mighty Atom*, Tezuka created the perfect combination. Atom was a robot that was endearing to young readers, who could see him as a "pal," or the kid next door, and a robot that also happened to be a mechanical creation, with artificial intelligence and superhuman abilities.

It is partly because of this ideal balance between human and the machine that, over the years, Mighty Atom became a symbol in Japan of advanced technology in general. In the 1950s he was not only a robot, but also the little boy next door who lived in the future—a future where science and technology had created a world of clever gadgets and a standard of living that Japanese could then only dream about. He was, according to the lyrics of the animation theme song, "a child of science," and over the years in the public mind, he—and robots—became linked to a wonderful future that science and technology could provide.

Tezuka claims this was not his intention at all. As a licensed physician with a strong background in the sciences, he had intended a character that was more cynical and more of a

parody. But publishers, the public, and the times pushed him into a more romantic depiction of the future, and as is often the case, his character took on a life of its own. "In the days after the war," as Tezuka said in 1986, "the publishers wanted me to stress a peaceful future, where Japanese science and technology were advanced, and nuclear power was used for peaceful purposes. At the time . . . the technological world I depicted was utterly fantastic. The flip side of the coin is that since most of the technology did not yet exist, I had the freedom of drawing whatever I pleased."[86]

Mighty Atom thus became a highly exploitable property, especially as Japanese industry recovered after the war and its homegrown technology became increasingly more advanced. Atom was exactly what corporations, even the government, needed in their advertising campaigns. With Japan's postwar de-emphasis on military technology and increased emphasis on peaceful uses of technology—especially "process," or manufacturing technology—Atom could symbolize a new, humanized sort of machine. Atom could represent advanced technology that was nonthreatening and could lead to a better future; a cuddly, warm sort of technology wrapped in scientific optimism. Atom could be a dream, and a goal for the future.

❍ ❍ ❍

In 2004, Mighty Atom, aka Astro Boy, was inducted into the Robot Hall of Fame. Established by the Carnegie Mellon University's prestigious School of Computer Science in 2003, the Robot Hall of Fame exists to "honor landmark achievements in robotics technology and the increasing contributions of robots to human endeavors." It considers two categories of robots: those in the real world, and those of science fiction, which have "helped form our opinions about the functions and values of real robots."[87]

It is no coincidence that in today's Japan, Atom has become linked to robotics research. It began very early. In the mid-sixties, as computers and automation were becoming more commonplace, Atom was used to illustrate educational books for children, such as a Kappa Comics 1965 special titled "The Science of Robots," the expectation being that something like Atom would ultimately be the end goal. Today, the number of books on robotics published in Japan—for adults as well as children—with Atom as some sort of theme is striking. They range from basic books on robotics for average readers to those exploring issues of autism and the limits of artificial intelligence.

Atom is also linked to a very specific type of robotics research: bipedal humanoid robots. In the United States and Europe, most people regard humanoid research as highly unusual, if not extremely eccentric, and scientists working in government, academia, or corporate laboratories find little funding available. But not so in Japan. There, research into humanoid robots is a legitimate theme, pursued aggressively even in corporate labs where short-term profits might be expected to dictate the directions of research. The research projects represent a belief that there will one day be "personal robots" capable of helping people in their daily lives, and that this will be a profitable market. Even more importantly, the research projects are a way to advertise advanced technology in a friendly, popular fashion. Honda's uncannily humanlike running and stair-climbing Asimo and Sony's dancing QRIO robots all currently have no practical application. But they do represent a corporate vision and dream with deep connections to Mighty Atom.

Researchers in Japanese robotics labs often grew up with Mighty Atom. In 1983, the scholarly *Journal of the Robotics Society of Japan* included a debate on bipedal robots. In it university researcher Ryōzō Katō commented, "We are of the Mighty Atom generation, and we were brought up looking at Atom in

Courtesy, Takayuki Furuta

Takayuki Furuta and Morph3.

comics and animation, so it just seemed like it would be a great deal of fun to create something that can walk." Three years later, in the same journal, Yūji Hosoda, another researcher from Hitachi, participated in a panel discussion with none other than Tezuka himself, and declared that, "I have always created robots, in the belief that someday they should be like Mighty Atom." More recently, one of the young stars of Japanese robotics—Takayuki Furuta, head of the Future Robotics Organization (fuRo)—has led development on a remarkable bipedal robot named Morph3. Furuta was confined to a wheelchair briefly as a boy, and in a variety of interviews he has acknowledged that the old black-and-white *Mighty Atom* TV series inspired him to become a roboticist like Dr. Tenma or Professor Ochanomizu and someday develop robots to help people. While a long way from being a Mighty Atom, Morph3 is compact, light, highly agile, and even capable of rapid shadowboxing. In 2003, Japan's Postal Service featured it in a series of stamps showcasing real-life science and technology and heroes of science-fiction animation, the spotlight on the latter of course being on Atom.[88]

Also in 2003, prominent robotics researcher Eiji Nakano authored a book on robotics for the general public. He titled it *Atomu no ashiato* (In the Footsteps of Mighty Atom), and deliberately timed it to the "Mighty Atom birthday" events then being held. In exploring, among other things, why humanoid

research is so popular in Japan, Nakano pointed out the religious, cultural, and historical differences between Japan and the West, but noted especially what he calls the "Atom effect." In the West, he says, people tend to regard humanoids as impractical, perhaps dangerous, and probably not even acceptable. In Japan, however, Atom is the ultimate imagined humanoid robot, and Atom has therefore created a unique sense of positive "expectation."[89]

❍ ❍ ❍

In truth, a real robot like *Mighty Atom* is still a long way off. Artificial intelligence is decades away from being able to pass the Turing Test. There is no miniature nuclear reactor available to power a humanoid robot, and even if there were, few people would feel comfortable being around a machine with an engine that, if it malfunctioned, might contaminate several square miles. And even if these problems could be solved, given today's technology, Atom would be so heavy from the weight of his engine and fuel and jets and actuators and gyroscopes and other components that he would probably crash through most normal floors.

Tezuka himself was fully aware of the issues. Over the years, his forecasts sometimes changed, depending on the situation and his audience, but he generally thought that an emotive robot like Atom would not be possible until the end of the twenty-first century, if ever. Ultimately, he predicted, it might not even be impossible to create a robot with true human intelligence and emotion, because a robot can only be an approximation of a human.[90]

7
A Medley of Messages

English is often used in Japanese advertising for graphic design purposes. The result may be odd spelling and fractured grammar, but the underlying message often rings true. The text on a *Mighty Atom* T-shirt sold during 2003 that paraphrased Osamu Tezuka is an example:

> I have been trying to express, in differnt [*sic*] ways through my work the message such as: "Preserve Nature! Bless Life! Be careful of a civilization that puts too-much stock in science, do not wage war, and so on."

Many articles, books, and documentaries in Japan have tried to explain exactly what Tezuka was trying to say with his *Mighty Atom* series, but for a variety of reasons it has never been easy. To begin with, Tezuka never expected the series to continue as long as it did. Although a visionary who set his story in the then-distant future, he was also a creature of his era and sensitive to current events, politics, and the changing tastes of his readers and editors. Over the two decades that Tezuka drew

the *Mighty Atom* manga series, the world changed drastically. When he began his story in 1951, Japan had just been defeated in World War II and was still occupied by the U.S. military. During the fifties and the start of the Cold War, the economy recovered, partly because Japan became a staging ground and supplier to the U.S. military for the Korean War. By the sixties—and especially during the 1964 Tokyo Olympics—Japan had fully re-emerged on the world scene as a vibrant democracy and an economic powerhouse. But the same sixties also saw the emergence of a powerful student and union movement protesting the Japan-U.S. Mutual Security Treaty and the Vietnam War.

Throughout this tumultuous time, the structure of the *Mighty Atom* series itself encouraged Tezuka to adapt the story to his evolving interests, for it never had a unified, linear plot, and in both manga and anime forms it was episodic. Other than maintaining a fixed cast of characters and a general framework for them, Tezuka was essentially free to come up with entirely new stories roughly every month. As a result, of all of Tezuka's many manga works, *Mighty Atom* may be the one which best reveals the breadth of his varied interests and his basic philosophy even as it underwent a long evolution.

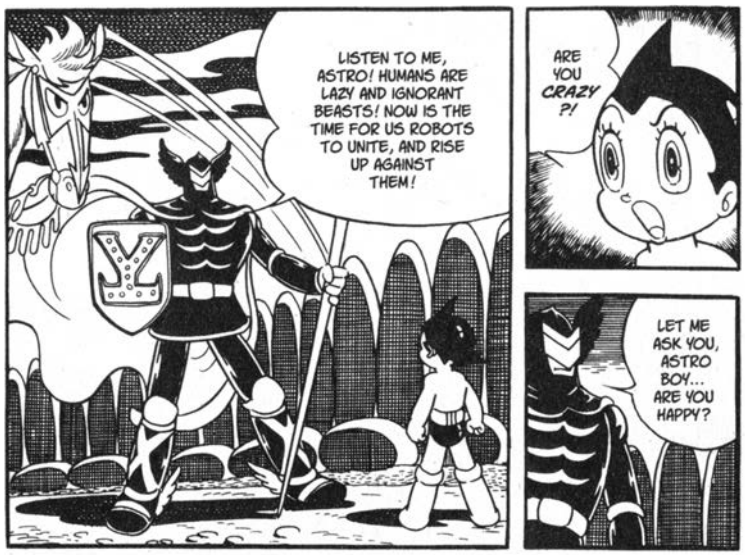
Early on, there was a severe disconnect between what the media thought *Mighty Atom* was about and what Tezuka thought it was about. Both young readers and adult reporters tended to be dazzled by the futuristic world and the novel technologies depicted in the series. Atom became, as the anime theme song proclaimed, "a child of science," and—for corporations, especially—the symbol of Japan's postwar pursuit of a new, peaceful type of high technology. But this exacerbated a perennial problem: many adults commenting publicly on *Mighty Atom* had often never read the original manga stories.

Writing in the *Tokyo shimbun* newspaper in 1967, Tezuka

explained that *Mighty Atom* was really about the chasmic misunderstandings and problems that might occur between man and robot in the future. "I never intended," he wrote, "to create a story set in the twenty-first century about a glorious scientific civilization." He was, instead, inspired by his frustrating and humiliating experience at the end of the war, of having been beaten by a group of American GIs because he could not communicate with them effectively in English. As he would write in seemingly countless other articles, *Mighty Atom* was about discrimination. Nonetheless, when he told this to reporters, they would invariably look disappointed and say, in effect, "Isn't there any other, grander theme? It's an exciting adventure set in space, and you're known for inspiring dreams in children. Can't you say it has some cooler, catchier message, or at least that you wanted to create a story about an ideal future?"[91]

Any adult who actually did read the original manga stories would have been hard pressed *not* to see the themes of miscommunication and discrimination. In the 1965–66 work, "Blue Knight," Tezuka imagines that a robot one day appears, programmed not to abide by the Law of Robots. Angry at the way humans treat robots, this robot (which, in line with the title, assumes the form of a medieval knight) declares: "[Humans] made the Robot Law for themselves! I'm going to make a new Robot Law, for *robots*!" He then goes on to stage a grand robot revolt, to liberate other robots around the world, and even to form a short-lived robot republic land called "Robotania." Despite the fact that Blue Knight is willing to kill humans and destroy other innocent robots to further his cause, Atom begins to sympathize with him and to see the logic of his arguments. Eventually, when humans turn on the rebel robots and destroy them, Atom is destroyed too, the story ending with Professor Ochanomizu swearing to rebuild him one day.[92]

Tezuka later wrote that this story, in which he depicts Atom



© Tezuka Productions

"Blue Knight," serialized in Shōnen *from October 1965 to March 1966. From the 2003 Dark Horse Manga* Astro Boy, *English-language edition*

as far more complex and darker in nature than usual, was partly a result of the times. It was the height of the student movement in Japan, a time when the streets were convulsing with protesting students and labor unions. Many other younger artists were increasingly drawing manga that appealed to an adult readership and were more hard-edged in theme; instead of the more traditional, virtuous heroes, they drew rebels and anti-establishment lone-wolf types. "Some people," Tezuka wrote, "said that my heroes were too optimistic, too upbeat, and acted too often as 'Champions of Justice.' I think it reflected a reaction to American-style democracy and a general loss of faith in Japanese politics and society." To make the *Atom* series more popular, a few younger editors even encouraged Tezuka to make him more of a rebellious "bad" kid instead of a goody two-shoes, or, as

Tezuka later joked, to have Atom be "more violent, smash buildings, and kill people." Always eager to oblige, Tezuka briefly tried to adjust Atom's image in episodes like "Blue Knight" and "Melanin Tribe," but the attempt backfired—"Blue Knight," in particular, becoming one of the most unpopular stories in the entire pantheon of *Mighty Atom* tales.[93]

In dealing with awkward issues, Tezuka nonetheless found that drawing stories about robots had some advantages, especially when he could add an element of parody. "There are always people who take offense at stories depicting discrimination in too real or raw a fashion," he wrote, "but making the victim of discrimination a robot rather than a human gives me a lot more freedom, and allows me to be far more provocative."[94]

Like its English counterpart, the Japanese word for discrimination, *sabetsu*, has a variety of meanings, and it can cover everything including social, religious, and racial discrimination. Japan itself is racially quite homogeneous, but minority populations of ethnic Koreans, the aboriginal Ainu people, and the *burakumin* have all struggled to gain equal rights with the majority and faced discrimination. In other, more adult manga stories such as *Shumari*, or even *Phoenix*, Tezuka did deal directly with Japan's own minority issues, but in *Mighty Atom* he may have felt this would be out of place because of the audience's age. Still, he did focus directly on a type of social discrimination, on the "bullying" that bedevils many Japanese schoolchildren. As an unathletic and "egg-headed" young child, Tezuka had often been tormented by older, bigger boys, so he well knew how much some of his young fans suffered.

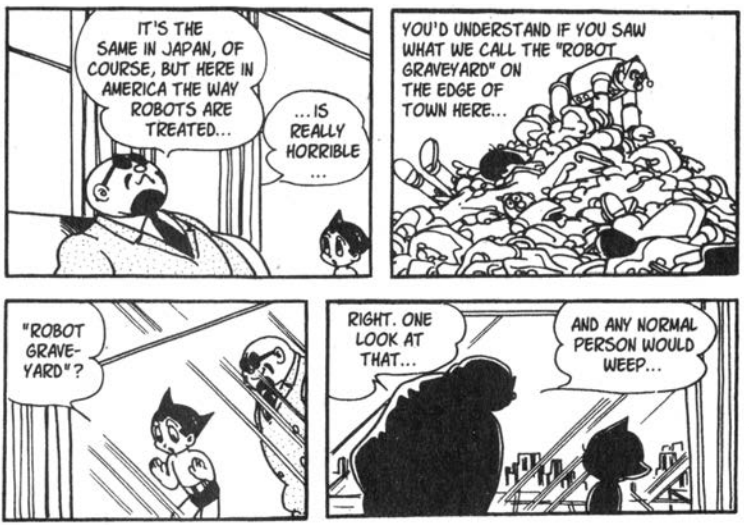
A surprising number of *Mighty Atom* stories are attacks on all types of racial discrimination. In the manga episode "The Tragedy of Bailey"—influenced by the U.S. civil rights struggle—Tezuka creates a story with references to discrimination in

America against Japanese immigrants as well as against blacks and other races. The story appeared in final form in the *Sankei* newspaper as part of the 1968 "'Once Upon a Time' Atom Tales," but it was actually a reworking of an episode done in 1962 for *Shōnen* magazine. In the final version, Atom travels to Los Angeles to visit Taba Koh, a Japanese American in the import-export business. As Taba Koh explains to Atom, he had come to America sixty years ago:

> As a new immigrant in those days, the whites treated us terribly. By the latter half of the twentieth century [they] started treating us better, but they still acted horribly to black people. By the end of the twentieth century, blacks had gained equal rights, but discrimination against robots increased. Having myself struggled against discrimination for so long, I couldn't stand to see robots mistreated. . . . I'm a human, but I know an *awful* lot about suffering and persecution, so I've decided to do what I can to help robots.[95]

In the story, Atom then meets Bailey, a robot promoting a robot civil rights movement. He accompanies Bailey to the local Los Angeles city office, where Bailey attempts to register as a human to gain the same rights that humans enjoy. But when Bailey walks out the door and publicly proclaims himself a human, he is destroyed by an angry crowd of human citizens, cursing and yelling "Death to robots!" Rather than a happy ending, the story concludes with Atom feeling deeply conflicted because the Robot Law had prevented him from using force to protect Bailey from the humans. Nonetheless, he returns to Japan, promising to work for the rights of robots.

Over the long years of the *Mighty Atom* manga serialization, Tezuka used a variety of techniques to raise young readers' awareness. In the fanciful 1952–53 story "Franken," Tezuka



"The Tragedy of Bailey," originally serialized as part of the Atomu konjaku monogatari *series in the* Sankei *newspaper between 1967 and 1969. From the 2002 Dark Horse Manga* Astro Boy, *English-language edition.*

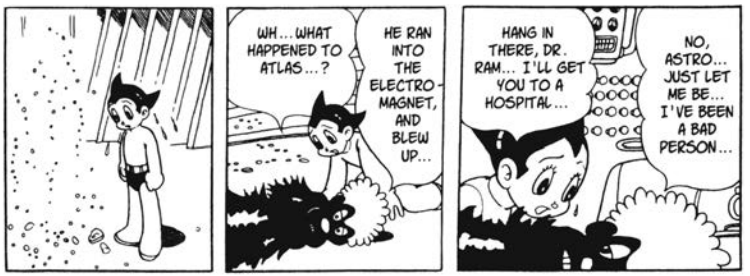
imagined that a sinister "revolutionary group" of humans (ringleaders wearing Ku Klux Klan–like hoods) masquerade as robots wreaking havoc, causing the general human population to unjustly blame real robots and consider banishing them altogether from Japan. In doing so, Tezuka connects the plight of innocent, persecuted robots to discriminated people everywhere, again drawing a direct parallel with African Americans. At one point, he shows Atom's grade-school teacher (Mr. Mustachio) expounding in class on the story of Abraham Lincoln and of slavery in America in the nineteenth century. When Mustachio declares "Lincoln said that black and white people were *equal!*" one of Atom's pals retorts, "Now, hold on, teacher, humans and robots are *different*. Robots are made to serve *humans*. Even my dad says so!" Of course, the story has a happy ending, as the

robots are absolved, the humans declaring, "We humans who despised robots for their actions should be ashamed!"[96]

❍ ❍ ❍

When Tezuka depicted actual humans instead of robots as victims of discrimination, he sometimes ran into trouble. The worst of it occurred after he died in 1989. In fact, had he lived to see what happened, he would have been mortified. In 1990, the Osaka-based Association to Stop Racism Against Blacks initiated a campaign to stop the publishing of "racist" imagery in Japanese media and was extremely successful. It took the hard-to-dispute position that the Japanese media contains too many negative stereotypes of people of African descent; that they are too often portrayed as grass-skirted, bones-in-noses cannibals, servants, jazz musicians, and so forth, and that in manga they are often heavily caricatured, with rounded faces, fat bodies, big eyes, and thick lips. The organization—which at its core was a single Japanese family named Arita—presented manga publishers with strident demands for retraction of what it deemed offending material, and then, after enlisting scores of religious and civil rights groups in the United States in a letter-writing campaign, it deluged the publishers with protests. That the American letter-writers were outraged was understandable. Most could not read Japanese, and they had often been shown isolated images taken out of context from long stories, sometimes from stories with a strong anti-discrimination theme. To the shock of Japan, one of the main targets of the campaign was Osamu Tezuka, by then a nationally revered "God of Manga."[97]

Of Tezuka's many works, the most problematic was not *Mighty Atom*, but his enormously popular *Jungle Emperor*, or *Kimba the White Lion*. Like *Mighty Atom*, *Jungle Emperor* was created in the fifties as a manga series and later animated for television. Set in Africa, it starred lions, but it also had human



© Tezuka Productions

"*Atlas*," *originally serialized in* Shōnen *from March to July 1956. From the 2003 Dark Horse Manga* Astro Boy, *English-language edition*.

characters. At the time in Japan, many people still regarded foreigners as exotic and mysterious creatures, and artists struggled mightily to draw them properly, just as artists in the West struggled to draw Asians. Unfortunately, Tezuka had learned how to draw nearly all of his human characters by emulating, among other things, white American cartoonists such as those employed by Max Fleischer and Walt Disney. It is one reason that Japanese manga and anime characters have such big eyes and Western features today. By default, in his early manga Tezuka used the styles that had been in vogue in America during the thirties and forties to depict African Americans, Africans, or indigenous people. Without intending to do so, he therefore wound up drawing in styles that Americans today universally regard as politically incorrect, or even racist.

Since the *Mighty Atom* series primarily depicts robots, it is relatively free of any offensive imagery, but it was not immune from criticism. "Atlas," created in 1956, is an example of one episode that the Arita family campaign specifically targeted. In it, a mad scientist named Dr. Ram creates a powerful robot (Atlas) who does not obey the Laws of Robots and who wreaks havoc on both robots and humans. Tezuka drew Dr. Ram in what would today be regarded as a racist style of drawing Afri-

can Americans, but in the story Dr. Ram is actually an Indio, or descendant of the Incas, and his motive for creating Atlas is to get revenge for the way his mother was abused by foreigners. As Dr. Ram explains in the story's dialogue:

> *Revenge!* That's right! I'll get revenge on the whites who invaded our Inca territory, and the whites and yellow people who made us serve them like slaves! . . . I'll get revenge by using robots, who are themselves being used like slaves *today!*[98]

In the wake of Tezuka's death, his company has chosen to deal with complaints of racism by always putting a disclaimer on all of his books in print, disavowing any racist motives on the part of the author and explaining that both the stories and art styles were created in a less enlightened time. This does not solve all problems, but it does help mitigate them, and it is a technique that other publishers of controversial works in both Japan and America might do well to emulate.

❍ ❍ ❍

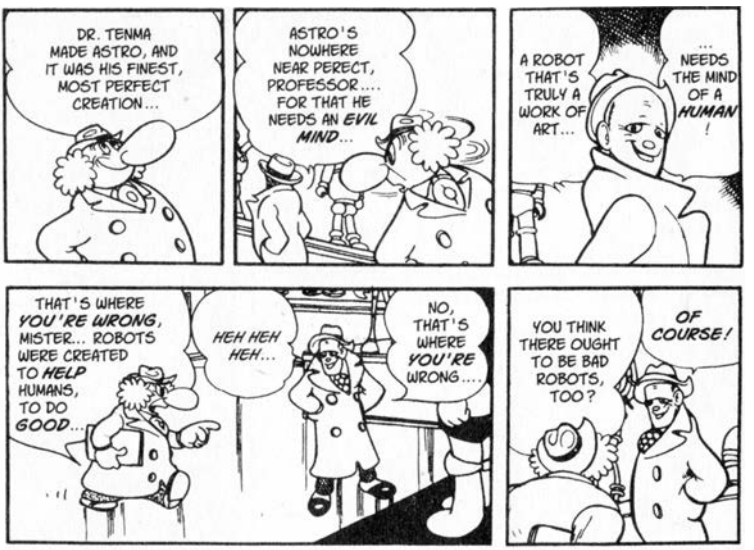
While many in Japan have embraced *Mighty Atom* as a positive symbol of science and technology, critics to the left of the political spectrum have often criticized Tezuka for needlessly glorifying it. Most, however, have usually been blinded by the hoopla surrounding the animated TV series and by the corporate advertising and merchandising surrounding the property. In the original manga stories, Tezuka actually advocates a distrust of science and scientific rationalism.

In episode after episode, a stock theme is that of arrogant humans who, intoxicated by science and technology, inadvertently cause a disaster. Often they are mad scientists who create rogue robots that wreak havoc on other robots and the human world. The villains are truly international, and may be Japanese,

or crazed inventors in exotic foreign lands, including the United States, Europe, Africa, or South America (or even outer space). The 1956 episode quoted earlier, "Atlas," has a wild subplot of construction companies using atomic power to whittle down the Japan Alps, to make them suitable for farming. This causes Mt. Fuji, which has been dormant for over a thousand years, to erupt and spew lava over the surrounding villages. After many twists and turns in the plot, Atom of course saves the day, but he is unable to save Dr. Ram, the creator of the rogue robot, Atlas. Before he meets his end, Dr. Ram announces, "I've been a bad person. I misused science and technology to get revenge on people, but it took revenge on me," whereupon Atom's teacher, Mustachio, sums up: "He was a great scientist . . . but he decided to create the *wrong things*."[99]

In the same "Atlas" episode, Tezuka explored another of his favorite ideas, that it would not be wise to create a robot with true human intelligence and emotion because such a robot can ultimately only be an approximation, or an imperfect replica, of a human. In the story, Dr. Ram had built his Atlas robot with a special "Omega circuit," which allowed him to have both good and evil thoughts. As Atom's surrogate father, Professor Ochanomizu, bluntly pointed out, this meant that the evil Atlas was ultimately even more "human," and thus a more "perfect" robot than Atom. It was an idea that of course made Atom terribly depressed.[100]

"When robots become truly self-conscious and have a sense of identity of who they really are," Tezuka once wrote, "then humans will probably perceive them as enemies." Atom, he explained, was a kind of parody of what people would expect of a perfect robot. He was a sort of Pinocchio, who is imperfect, who gradually becomes more perfect, but eventually has to be readjusted so that he will not turn against humans and will continue to be a "champion of justice." It was a theme Tezuka



© Tezuka Productions

Dr. Ochanomizu and the nefarious criminal Skunk engage in a dialogue about robots in "Electro," first serialized in the January 1955 supplement edition of Shōnen. *From the 2003 Dark Horse Manga* Astro Boy, *English-language edition*.

returned to repeatedly, not only in "Atlas," but also in episodes like "Blue Knight" and "Electro."[101]

Tezuka drew many manga stories illustrating the horrors of nuclear weapons and nuclear war, but his little robot hero, Atom, had an atomic engine. As a result, throughout his life, Tezuka did have to contend with the connection he created between Mighty Atom and nuclear power. When he began the series in the 1950s, people all around the world hoped humankind could somehow use the terrifying new technology of the atom for peaceful purposes. It was an era when American popular literature was filled with happy-sounding ideas for backyard atomic power plants, atomic-powered cars, even atomic passenger planes. Before the dream imploded amid the reality

of deadly radioactive waste, nuclear accidents, and engineering problems, atomic power seemed as though it might solve humankind's age-old thirst for cheap, safe energy.

As the problems with peaceful atomic power became more widely known, Tezuka gradually tried to disassociate himself from the illusions surrounding it. He developed a firm policy of not allowing power companies to use Mighty Atom imagery to promote atomic energy. Sometimes, however, it was too hard for corporations or pronuclear individuals to resist the temptation to connect Atom to nuclear power, after which Tezuka would have to come out in public giving interviews stating, "I too am against nuclear power plants!" Still, to avoid completely negating the premise behind his wildly popular Mighty Atom character, he did manage to waffle a bit on the issue and would later often proclaim that he believed that in the future, power from nuclear fusion—as opposed to the more deadly and polluting nuclear fission—might be possible. And in fact, when he created a new *Mighty Atom* animated series in 1980, he made Atom's engine a fusion reactor. For fuel, it only required the relatively harmless isotope deuterium, also known as "heavy water."[102]

❍ ❍ ❍

Tezuka's skepticism of science and technology stemmed from his inherently pessimistic view of human nature, which in turn came from his own experiences. As a young man during the war, he had witnessed intellectual betrayal and inhuman cruelty. As a medical student, he had contemplated life and death at the most basic level. But in this context it is interesting to note that in Japan the first word usually associated with Tezuka and all of his work is *hyūmanizumu*, or "humanism." Most Japanese writers immediately seize upon this term and use it in either a positive sense (as in referring to Tezuka's love for humanity) or a deroga-

tory sense (implying that he has an overly simple or naïve view of human nature). Yet in Japanese, as in English, humanism is an extremely vague term, and it is doubtful that most of those using it are aware of its sub-meanings. Even in English dictionaries, the definition branches quickly from a general belief in the dignity of all humankind to "Marxist," "religious," and "secular" humanism, as well as the humanism of the Renaissance. In fact, in today's world it is probably hard to get any two people to agree on one definition. Like the word itself, Tezuka's view of humans, as reflected in all of his works including *Mighty Atom*, was extraordinarily complex.

In all of Tezuka's works, good people are easily capable of turning bad, especially if they are in positions of power—scientists, politicians, police; no one is immune. And it is almost always in this context that humans ultimately use robots and technology for nefarious purposes. But the converse is true too. Bad people can also turn good and achieve some sort of redemption (although they may lapse again later). In reality, Tezuka was fascinated with the complexity of human nature, and it is in this sense that his best manga stories (even if, like Mighty Atom, they were intended for children) begin to resemble good Russian literature.

Another related and constant theme of Tezuka's work, including *Mighty Atom*, is a belief in the stupidity of war. It was a hallmark of his generation, many of whom had seen fathers, uncles, and siblings drafted and sacrificed on the altar of Japanese nationalism. Tezuka was old enough to have been indoctrinated in the prewar ideology of militarism and blind emperor-worship, but also smart enough and young enough at the end of the war to instantly realize what a colossal waste it had all been, and to realize how he—and everyone else—had been duped by their leaders. The result was an inherent mistrust of all national leaders and revulsion over the very idea of war. In Japan to-

day there is a strong movement to revise the constitution that the American occupation authorities bequeathed the nation in 1947. It was a highly progressive document for the time, denying the divinity of the emperor, providing equal rights for women, and, most famously, declaring that the Japanese people would forever "renounce war as a sovereign right of the nation" and never maintain "land, sea, and air forces, as well as other war potential." To most of Tezuka's generation, the new constitution seemed like an excellent idea.

In general, Tezuka avoided overt discussion of politics in either his life or his manga. His sensibilities are nonetheless easily evident in various episodes of *Mighty Atom*. Among his stock themes are the abuse of power by the authorities, a belief in the United Nations, and the evil of war and nuclear weapons. Above all, he made sure that Atom usually fought not only for justice, but also for the ultimate hope of a devastated Japan right after the war, which was peace.

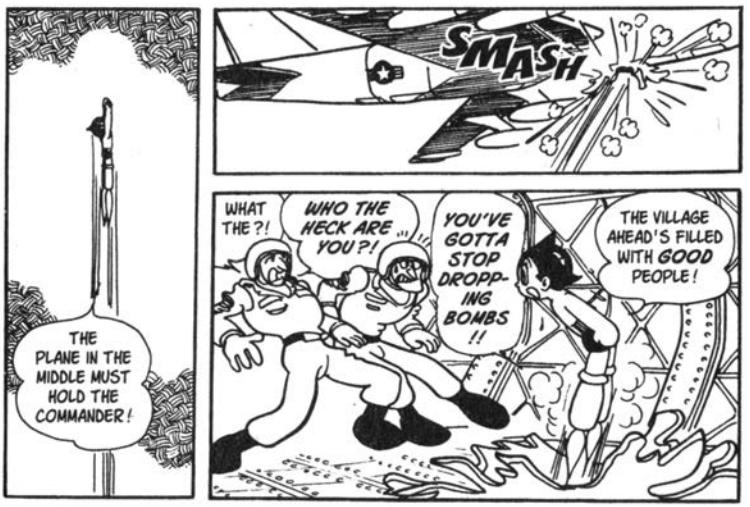
By far the most overtly political episode in the entire *Mighty Atom* manga lineup is "The Angel of Vietnam," an episode in the "Once Upon a Time" series in the *Sankei* newspaper from 1967–69. In the story, Atom goes back in time from the twenty-first century to 1969 and finds himself in a village of poor Vietnamese peasants. When American bombers come to bomb the village, thinking that the residents are Vietcong and indiscriminately attacking them, Atom saves the day by flying up and tying the bombers into pretzels. It is one of Tezuka's most didactic pieces and thus less interesting than most, but more revealing of his political leanings at the time. The Vietnam War was then raging on the Asian mainland, not far from Japan, and many Japanese intellectuals—despite great feelings of friendliness toward Americans in general—felt solidarity with the Vietnamese and were appalled by the conflict.

Tezuka's appetite for media exposure at times bordered

on the promiscuous, but he was normally careful to keep his opinions—whether on television, in lectures, or in articles—to politically innocuous subjects. Still, Vietnam was one of the rare exceptions, and in 1965 he wrote a newspaper article on the Vietnam conflict, expressing his view (along with that of many others) that it was an internal matter for the Vietnamese to decide. According to Tezuka, Russia, China, and the United States were like "crazed elephants," along with tiny Korea, making what was essentially a civil war more complicated than necessary. Japan's logistical support of the American military, he noted, was something few Japanese thought about but that he believed would become a "blot on Japanese history."[103]

Unlike many younger manga artists and animators such as Sanpei Shirato or even Hayao Miyazaki, Tezuka was never overtly anti-American or Marxist in his worldview. During the sixties, Marxist thought held sway among many Japanese intellectuals, who frequently laced their speech with references to "capitalism," the "proletariat," and the "working class," but that was not Tezuka's style. Still, he did once appear on a blacklist compiled by Japan's long-term ruling party, the Liberal Democratic Party, apparently for having once recommended a Japan Communist Party candidate for office, and possibly for his work for *Akahata*, or the "Red Flag" newspaper, which is the official organ of the Japan Communist Party.

In postwar Japan, the Communist Party has remained legal, and it has rarely been considered particularly radical, its newspaper generally regarded as boring rather than inflammatory. There is no evidence that Tezuka was ever a party member, but his relationship with the party newspaper—and by extension the party—has long been a source of speculation in Japan, amplified by the desire of the paper to emphasize his work for them. In 2007, the *Akahata* Web site was still reprinting an article from April 7, 2003, celebrating the "birth" of the "gentle-



© Tezuka Productions

"The Angel of Vietnam," originally serialized as part of the Atomu konjaku monogatari *series in the* Sankei *newspaper from 1967 to 1969. From the 2002 Dark Horse Manga* Astro Boy, *English-language edition.*

spirited" Mighty Atom. Noting the antiwar spirit of the series and Atom's support of the Vietnamese during the U.S. "war of invasion," it states: "Mr. Tezuka first expressed his support of the Japan Communist Party in 1962, and subsequently, when giving speeches during election time, he always stressed the need to expand the antiwar Japan Communist Party."[104]

Were he alive today, Tezuka would probably be somewhat irritated to see this, for in the paper he drew simple apolitical cartoons or wrote apolitical commentaries on youth culture. In the early sixties, moreover, accepting work from the paper was probably a way for him to personally counter the overwhelming power in the Japanese political system of the conservative Liberal Democratic Party (which has ruled almost without interruption since 1955).

In reality, he simultaneously wrote or drew in a wide

variety of other magazines and newspapers, even serializing his "'Once Upon A Time' Atom Tales" in the right-leaning *Sankei* newspaper. As he wrote in his defense in 1965 after learning that his name was on the Liberal Democratic Party list, "Frankly, I consider anyone who is thoroughly steeped in the ideology of the left or the right to be an idiot."[105]

Tezuka Answers a Survey

In April 1967, the literary *Bungei shunjū* magazine did a survey of one hundred prominent Japanese opinion leaders and thinkers, asking eight categories of questions. Yukio Mishima was a famous novelist and nationalist who later disemboweled himself in a ritual suicide-protest. He was a contemporary of Tezuka who liked realistic and violent *gekiga*-style manga. Tezuka and Mishima responded as follows:

Question Asked	Mishima	Tezuka
age	42	40
occupation	writer	cartoonist
political parties supported	conservative	progressive/reformist
the one book you would take on a trip to outer space	*Arabian Nights*	an encyclopedia
the one thing you would take on a trip to outer space	a Japanese sword	a pencil and notebook
what you would do if given ¥10 million	deposit it in a bank	afraid to even think about it
what you would do if you had no income at all	practice *kendo* swordsmanship	collect insects
what sort of TV programs you watch	*Ultraman*	science programs

Tezuka was used to criticism, and during the decades that he created his *Mighty Atom* series he received it from many quarters, often from people who misunderstood what he was trying accomplish. As he liked to recount much later, at the beginning of the series he was roundly attacked by parents and educators for what now seem comical reasons, for depicting things that seemed too unrealistic or preposterous, such as the very idea of robots, or people going to the moon, or there being freeways or bullet-trains in a future Japan. At the extreme, people accused him of being an "enemy of youth." And he was denounced once when a young boy in northern Japan jumped from the second story of a building in imitation of his hero, Mighty Atom, and injured himself.[106]

In the United States in the fifties, the comic book medium was nearly destroyed by a moralistic coalition of critics who claimed that comics were ruining the youth of America. After a U.S. Senate Subcommittee to Investigate Juvenile Delinquency held hearings to investigate comic books, publishers—terrified of the negative attention—initiated a Comics Code Authority. The Comics Code, copied from Hollywood's self-censorship code, was so draconian that stories thereafter devolved into monotonous superhero, teen humor, and "funny animal" fare. The result was that the industry nearly collapsed, especially when television gained popularity and sucked away bored young readers. It has never completely recovered.[107]

Like the United States, Japan has also experienced periods when critics attacked manga for their overly violent and sexual content and supposed contribution to illiteracy. This was particularly true right after the war, when, unlike today, few adults normally read manga, and thus had a built-in bias against them. The Campaign to Banish Bad Reading Matter in the 1950s, which had the slogan of *uranai*, *kawanai*, *yomanai*, (Don't sell them, buy them, or read them) is an example. The campaign

initially targeted cheap erotic magazines, but when a PTA in Okayama city burned offending matter, it also threw manga on the fire. Unlike in the United States, however, comics publishers in Japan persevered, artists only temporarily restrained themselves, and readers kept reading, even as they entered high school, then college, middle age, and retirement. As manga became a medium of expression rivaling other print and visual media in popularity, the Japanese industry continued to prosper, peaking around 1996, when the sales volume of manga reached a staggering 40 percent of the market for all published books and magazines in the land. To today's Japanese, bombarded with erotic and violent images in television, print advertising, video games, and movies, the concerns of adults in the pre-television era of the 1950s now seem positively quaint.[108]

Throughout the anti-manga campaigns in Japan, Tezuka kept drawing *Mighty Atom* and other stories. Since *Mighty Atom* was a manga series for children and starred robots, eroticism was never much an issue, but violence was, since battle scenes were one of the work's key attractions. In them, Atom regularly fought with crazed robots (often manipulated by evil scientists), and sometimes he had to smash them in a spectacular fashion. To Tezuka's dismay, early media critics in Japan tended (as they still do) to become fixated on minutiae and to overlook his overall themes. He was especially aggravated by those who obsessively insisted on tabulating the number of times he drew a sword waved, a gun used, a bullet fired, or a robot smashed.

As a recognized intellectual, the pioneer of the modern manga format, and by far the most famous manga artist in Japan, Tezuka increasingly functioned as an arbitrator between critics and the industry. It was a role that he was very good at, and when reporters needed a comment (or a rebuttal to any criticism of manga), he was always the one they hoped to snare for a well-thought-out quote.

Of course, as a public defender of manga, Tezuka was also subject to criticism from artists and readers, especially when times changed. In the sixties, as readers of manga aged, they wanted more realism. When often erotic and violent *gekiga*, or "action pictures," exploded in the market, Tezuka started to look like a bit of a fuddy-duddy, or someone who could only draw moralistic stories for small children in a cute, Disney-esque style. At the same time, Tezuka was a highly competitive and somewhat jealous individual, so his response to this criticism was to increase the wattage and realism of his stories, and include more nihilistic themes and, inevitably, violence. Usually this took the form of competing head-on with his critics, often by creating manga with violence and psychosexual overtones in magazines targeted at mature readers, but sometimes his frustration would spill over into his *Mighty Atom* series.

An example is "The End of Atom," which Tezuka drew in 1970 in pseudo-*gekiga* style, for the supplement edition of *Shōnen magajin*. The manga magazine had a readership of slightly older boys and young men, and the episode is one of the wildest, oddest, and goriest that Tezuka ever drew. It starred a disturbed young hippie-esque human, with Atom in a supporting role. The young man, in addition to blasting away at robots, hangs a human girl and blows several other real humans to pieces, all in graphic detail, before himself getting zapped by robots with ray guns. As Tezuka wrote later, "At the time, the radical student movement was at its peak, and many *manga* and *gekiga* had become somewhat dark and nihilistic. My story was probably influenced by this, because whenever I go back and read it, the plot seems very dark and disturbing."[109]

In a remarkable short essay written in 1981, Tezuka compared himself to the various "turncoats" of history, such as those who, in Japan's feudal period, renounced their Christianity to survive in the face of religious persecution. Right after the war,

he noted, people attacked manga every time an artist drew a pistol or a sword or used improper language, since they could only think of manga as something to teach small children good morals. But in recent years, he pointed out, manga had attained full recognition in adult society, and conversely now contained graphic blood spatters, nudity, and sex, to the point that adults found normal manga for children too boring. Critics increasingly said, he claimed, that Tezuka's manga, in particular, were "old-fashioned" and "no good."

> Manga depend on an "up-to-date" sensibility, so I have occasionally felt forced to include more violence in my manga. In fact, I have shamelessly betrayed myself this way, over and over again. Yet before I do, I usually become nearly neurotic. I develop terrible inferiority complexes, take it out on those around me, and experience the most extreme psychological dilemmas, before finally adapting my style to meet the tastes of the majority. Of course, in the process many of my long-term fans feel that I have betrayed them, and they then ridicule and abandon me. . . . I will likely face this dilemma many times again in the future, but there is one principle that I will never betray, even on penalty of death, and that is my opposition to war. Whatever happens, I intend to continue drawing antiwar themes. On that point alone, I refuse to become a turncoat.[110]

❍ ❍ ❍

In North America and Europe, attacks on the excesses of comics and animation often come from religious groups, which cast themselves as guardians of social morals. In Japan, however, PTAs, parents, educators, media critics, and politicians are usually the ones to raise a fuss. Thus, throughout its long

serialization, religious groups rarely attacked *Mighty Atom*, and this more than anything else probably reflects the different role that religion plays in Japanese society. Most Japanese pay lip service to more than one religion. As an old joke goes, people are married in the native animistic Shinto faith, buried in Buddhist ceremonies, and occasionally attend Christian churches to practice their English. In reality, most Japanese families are affiliated in some form or other with both Buddhist temples and Shinto shrines, but many individuals would call themselves agnostic or apathetic about religion. Less than one percent of them are Christians. The result is often a reluctance to critique matters from a religious standpoint.

In *Mighty Atom*, Tezuka stripped his view of the future of many uniquely Japanese cultural references, perhaps because he was trying to be "modern." He also included very few direct references to traditional Japanese faiths, but he does have references to Christianity. One example is the previously mentioned "The Eyes of Christ," a mystery episode created in 1959, where a crucifix on the church wall gives away the bad guys after they have murdered the priest.

In North America, Tezuka is sometimes assumed to have been a devout Buddhist because of his award-winning and long-running manga series *Buddha* about the life of Buddha. His family was associated with a Zen Buddhist sect, and Tezuka is buried in a Tokyo Buddhist cemetery, but his views on religion were actually quite agnostic and as flexible as his views on politics. Toward the end of his life, Tezuka and his company were creating a long-running animation series titled *Seisho monogatari* (Bible Stories) about the Old Testament for the Vatican and Italian television, yet initial scripts had highly animistic scenes that had to be edited out.

Shortly before Tezuka died, he firmly expressed his opinions about all religion. In the introduction to the last volume

of *Phoenix*—a manga series that he worked on even longer than *Mighty Atom* and which most explicitly covers his views of the universe—he wrote:

> All faiths are ultimately man-made. They do not derive from any fundamental principles of the universe. Rather, they are a product of the constantly renewing culture of the times. And older beliefs will therefore always come into conflict with an ever-changing culture, giving rise to yet another kind of world.[111]

❍ ❍ ❍

Ultimately, Tezuka's religion was that of both a scientist and a believer, and his belief was in the sanctity of all life, whether it be human, animal, insect, plant, or even planetary. One could even call him an early "Gaian," or someone who would have agreed with the idea, popularized in the mid-1970s, of the earth as a living organism, except that Tezuka would have gone far beyond that and included the entire universe. It was a view that allowed him to tell stories of breathtaking scope and complexity, especially when he later began drawing for adults. But it was a trend apparent even within the limited framework of children's manga, and also at the very beginning of the new medium he helped to create.

In *Mighty Atom*, this worldview allowed Tezuka to create one of the more prescient episodes of his entire series. Titled "Red Cat" and written in 1953, it is the story of a mad professor, distraught at the overdevelopment and destruction of a region outside of Tokyo known as Musashino, once famous for its natural beauty. In this episode, Tezuka liberally paraphrases words from the famous 1901 work *Musashino* by the romantic, naturalist poet and novelist Doppo Kunikida. With clear allusions to the destruction of the natural environment in mod-

The ecologically minded Professor Felini expounds on nature in "Red Cat," first serialized from May to November in the 1953 edition of Shōnen. *From the 2003 Dark Horse Manga* Astro Boy, *English-language edition.*

ern Japan, especially that of his boyhood haunts of Takarazuka, Tezuka constructs a fanciful mystery in which the animals in Musashino have gone wild and begun attacking humans. As Atom discovers, the animals are being controlled with a special "ultrasonic hypnotizer" by a former professor, who is himself masquerading as a cat, trying to block an evil construction

company from developing the area. Of course, the professor has gone too far by attacking people and he must eventually die for his excesses, but before he expires the construction company is also forced to promise to forever protect his beloved forest. In reality, the Musashino area did not fare so well after 1953, as developers turned most of it into the paved suburbs of greater Tokyo. Nonetheless, in 1953 Tezuka was far, far ahead of his time in drawing attention to the problems of overdevelopment and the fragility of the ecological system. And the "Red Cat" episode of *Mighty Atom* was but one manifestation of his lifelong interest in nature and belief in the sanctity of life.

❍ ❍ ❍

A year before he died, Tezuka gave an interview in which he summed up all the disparate messages in his work:

> My manga have a wide variety of themes—they are a paean to life, they are antiwar and they are antinuclear, and they advocate the preservation of nature—but ultimately they are all one thing. They are the following appeal to young readers, to think objectively about this fragile Earth: When you grow up, don't forget to look at both Earth and mankind objectively. And always think about what it means to be human.[112]

8 A Complicated Relationship

Osamu Tezuka killed off Mighty Atom—the hero of his most popular story—at least three times in his manga series and once in an anime version. It was an act he may have committed out of frustration, for Tezuka sometimes declared *Mighty Atom* to be his "worst work." At the same time, Tezuka was intensely proud of his character's success, and since Mighty Atom was not a human character but a machine that could be rebuilt, he always seemed to be able to find a way to bring him back to life again.

Tezuka first finished Atom off in the manga story "Blue Knight," originally serialized in *Shōnen* magazine between October 1965 and March 1966. It was a controversial story, especially because it ran while the *Mighty Atom* TV animation was still continuing and still very popular. It featured Atom—an emotive, humanoid robot—caught in a true moral dilemma. When the Blue Knight robot led a campaign of oppressed robots in revolt against their human masters, out of fear the humans began incarcerating other similarly designed intelligent

© Tezuka Productions

Professor Ochanomizu carries a smashed Atom off the battlefield in "Blue Knight," serialized in Shōnen *from October 1965 to March 1966. From the 2003 Dark Horse Manga* Astro Boy, *English-language edition.*

robots and destroying them. In part to save his own robot "parents," and in part from indignation at the way humans were treating robots, Atom sided with the Blue Knight forces, but in a climatic finale he was tragically destroyed. The story ended with Professor Ochanomizu carrying Atom off the battlefield, vowing to somehow rebuild him—which did happen in the *Mighty Atom* manga episode that Tezuka began serializing right after "Blue Knight."

The final episode of the original black-and-white TV-animation series, "The Greatest Adventure on Earth," aired on December 31, 1966. In it, Tezuka again seemed to drive a stake into the heart of his mechanical progeny. After a long hiatus from direct involvement, Tezuka had come back to the production, and, working from a script he personally wrote and directed, he had Atom save an overheated earth by flying directly into the sun astride a device designed to stop nuclear fusion. It was a terrible shock to young fans, who assumed that Atom had been vaporized, and Tezuka was later deluged with letters complaining about Atom's demise and hoping that he might *somehow* have survived.

Partly as a service to these disappointed viewers, on January 27, 1967, only nine months after finishing his long manga serialization in *Shōnen* magazine, Tezuka resurrected the *Mighty Atom* manga series in the *Sankei* newspaper under the title of "'Once Upon a Time' Atom Tales." It took some mental gymnastics, but in the new series Tezuka also miraculously resurrected Atom, positing that, instead of having been vaporized, the nearly melted little robot had been rescued in outer space by aliens in the form of spacesuit-wearing locusts, who had miraculously repaired him. Thereafter, through a variety of clever plot devices, Tezuka had Atom go back in time (from the original twenty-first-century story line) to 1969, then 1993, and eventually 2003 (when he was originally born). Since two

identical objects cannot exist at the same time without creating a "time paradox," the first Mighty Atom is destroyed in an explosion, but his spirit and identity survive in his surviving counterpart. It was, as one book subsequently written about *Mighty Atom* suggests, a sort of Buddhist reincarnation of the soul, only in the form of a robot, and may have been influenced by the fact that Tezuka's wife, Etsuko, was then pregnant with their third child.[113] But such themes of rebirth were a staple of Tezuka stories. For the paperback compilations, as was Tezuka's wont, he later went back and eliminated the scene showing locusts rescuing Atom and had him merely blown into the twenty-first century by an explosion. The *Sankei* newspaper serialization ended rather inconclusively in February 1969, but that didn't seem to matter much, since by then the manga and the already completed anime series were totally out of sync anyway.

On July 7, 1970, Tezuka had Mighty Atom seemingly "die" one more time. In the previously cited one-off story titled "The End of Atom," serialized in the supplement version of *Shōnen magajin*, he imagined a future world where robots have taken over and are raising humans to be gladiators for entertainment. In this new age, Atom is already a museum piece. Takeo, a long-haired human youth clothed in headband and a circa-1970-style army jacket, tries to shoot his way to freedom with Julie, the girl he loves who, unbeknownst to him, is really a robot. Takeo retrieves Atom from a museum and revives him, and Atom—designed to serve humans—helps the two lovers escape to a remote island. When the robot authorities come after Takeo, Atom flies off to confront and destroy them. Takeo is forced to make his last stand on a mountain top, where he is shredded by incoming enemy fire, the implication being that Atom, too, had presumably already failed and been destroyed. Nonetheless, as Tezuka wrote a few years later of the same episode, "I certainly don't consider it to be the final chapter in the Mighty Atom

saga." And, true to form, for the next decade he continued to draw new Atom stories off and on in a variety of magazines.

Along with other writers, Michio Tanaka—author of the book *Atomu wa boku ga koroshimashita* (I Killed Mighty Atom)—claims that Tezuka effectively ended his series with the "Blue Knight" manga episode in 1966. All subsequent stories created, Tanaka says, were really just done out of inertia, and were superfluous to the total work. Some critics have been even harsher. In a rather lofty article of criticism about Atom and "Robot Esthetics" in 1967, Tomoharu Itani lamented: "Where is the essential robot-beauty in Atom these days? He is nothing but a wanton destroyer, a hollow superman in which no inner 'man' dwells, flirting with young fans and flaunting his concept of justice. The further Atom gets away from being a robot, and the more humanlike he becomes, the more corrupted he becomes."[114]

❍ ❍ ❍

Fans and critics are supposed to have strong opinions, but it is clear that Tezuka was also frustrated by *Mighty Atom* for a raft of reasons. At the start of the manga series he was unhappy with the short, episodic nature and the situation-drama structure of the stories. It required him to think up new stories all the time, and made it difficult to develop the sprawling, long-arc plots at which he excelled. But most of his frustration actually stemmed in one form or another from the huge success of *Mighty Atom* and, in particular, the original black-and-white TV-animation series. When Tezuka terminated the TV series in 1966, distraught fans deluged him with protests, and puzzled reporters bombarded him with the question: Why would anyone end such a popular, seemingly profitable work?

In an April 1967 article titled "The Death of Atom" in the prestigious *Chūō Kōron* journal, he tried to explain himself. It was

a result of fatigue on his part and that of the staff. Merchandise sales had also leveled off and royalty income declined. And, he noted, too many competitors had appeared on the market, coming after *Mighty Atom* "like hungry hyenas," shamelessly stealing ideas, scripts, and even character designs. Nonetheless, despite having ended the animation, Tezuka reassured readers that even though he had terminated the *Mighty Atom* animated series, he fully intended to continue the manga version. His biggest problem with the animation, he said, had been the constraints on content that television imposed—especially the need to water down stories so they would appeal to a mass audience and fit into a thirty-minute time slot. Asking himself why, if it had really been so much trouble, he had ever undertaken to animate his story, he answered his own question:

> It was because there was this new, mysterious mountain called "television animation" in front of me, and I wanted to clear a path to climb it. It was a narrow and rough path, and hard to hike, but I felt that something good would come of it. The Mushi Productions' executive in charge of the *Mighty Atom* series died the very day we finished production on the last TV episode, and to me his funeral was also like a funeral for Atom. O Atom, I thought at the time, May you rest in peace. . . .[115]

In reality, Tezuka's feelings about his most famous animated work were far more complex than he usually let on, and in other writings later, he would voice far more varied complaints.

❍ ❍ ❍

Unlike Walt Disney or later Japanese animation stars such as Hayao Miyazaki, Tezuka was never cut out to be a business or organization manager. He was first and foremost a storyteller

and a manga artist. Running a company the size of Mushi Productions—which produced not only the *Mighty Atom* TV series, but many other successful TV and theatrical features for both children and adults—required a large organization, and an organization required delegating authority. And delegating authority meant something he abhorred—losing control over his own creations. Yoshiyuki Tomino, known today for his own *Gundam* series, worked for Tezuka in the Mushi Productions era and directed more of the original *Mighty Atom* animation episodes than anyone else. After Tezuka began producing animation again in the wake of the Mushi Productions bankruptcy, Tomino wrote:

> There was no way someone with such an artistic temperament as Osamu Tezuka could ever successfully become an organization man. Yet he is still in charge of an animation production today. It means, in other words, that animation is like an addictive drug to the man, and that he will never be able to give it up.[116]

To maintain the tight production schedule for the weekly *Mighty Atom* TV-animation series, Tezuka had to use scenarios that he had not written himself. As the Mushi Productions organization became larger and more complex, Tezuka began to feel that his own ideas and suggestions for new stories were often being ignored, even though it was his own work and his own company. With pressure from sponsors and young fans alike, newer episodes tended to devolve into action-oriented formulaic pieces, where evil robots appeared on the scene and Atom was required to smash them and save the day. The anime series, instead of having the complex, often thought-provoking and unhappy endings that Tezuka wove into his manga, increasingly followed a simple good-versus-evil plot. He complained:

> Atom ceased being cute, and became more of an unrealistic character in the style of a ninja or an American Superman. And more than anything, the show stopped having the fundamentally entertaining aspects of animation; gags and humorous sequences started to disappear, and instead the show became focused on making Atom look "cool" or be a simple champion of justice. And of course this was also partly because it was easier for people to write scripts that way.[117]

In the same vein, Tezuka did not like the way *Mighty Atom* became associated, especially through animation-related corporate sponsorships with a glorification of science and technology, since this was counter to the original theme of his work.

> To tell the truth, towards the end of the series, Atom still looked like Atom, but he was no longer my own son. Ratings remained high, so the "education-mamas" and the schoolteachers and commentators—who know nothing about manga but always swallow whole anything they are told by the newspapers—kept focusing on what a wholesome work *Mighty Atom* was and kept giving me more and more awards.[118]

In a somewhat complicated fashion, Tezuka also did not feel comfortable with the way Japanese TV animation subsequently developed, partly as a result of his success. He had started production almost on a gamble, with cutthroat schedules and what were at the time unimaginably low budgets. *Mighty Atom* had pioneered an extreme form of limited animation, a type of low-cost animation that created a brand new market and ultimately helped make Japan a leader in television animation. Tezuka was simultaneously proud of and embarrassed by this fact. In his heart of hearts, he was in love with Disney-style full animation, with its smooth and flowing movements and lovingly

created characters. Had he had the budget and the time to do so, he would have loved to have created *Mighty Atom* in this same style, for the production system he developed was really the direct result of impoverishment and a lack of resources. And yet, Tezuka's form of limited animation went on to become the de facto standard in Japan and one of the hallmarks of Japanese animation today. As Tezuka noted wryly years later, intellectuals and critics who talked about *Mighty Atom* often imparted great philosophical meaning to the long pauses and limited action of the film. They assigned a high-art motive to it that had never really existed in the beginning—even calling it a "uniquely Japanese technique" and a clever application of the Kabuki tradition of *mie*, where actors freeze in a dramatic flourish.[119]

One thing Tezuka rarely mentioned, but may have felt some additional responsibility for, is the perpetually impoverished working conditions of the Japanese animation industry—an industry most outsiders assume is awash in cash because of its global success. In a special feature of *Sight* magazine in 2003 titled "Why did Osamu Tezuka Hate Atom?" publisher/editor Yōichi Shibutani and Mamoru Oshii—the director of *Ghost in the Shell* and other world-famous anime features—explored this theme, Shibutani stating:

> Because of his intoxication with Walt Disney, [Osamu Tezuka] created Mushi Productions, negotiated by himself with sponsors, and succeeded in having *Mighty Atom* broadcast as a series of thirty-minute episodes on TV. In doing so, he laid the foundation for the modern Japanese TV-animation business, but over the years *Mighty Atom* also created new conventions in the industry, to the point where it also served as the cornerstone for the current low-wage system in which people are now employed.[120]

It is a criticism echoed by others as well. After Tezuka's

death in 1989, the media in Japan was inundated with paeans to him from other artists and intellectuals. Yet the darling of the anime world then, Hayao Miyazaki, was a notable exception. In an interview done that same year, Miyazaki praised Tezuka's manga work, but claimed that his anime was mainly filled with "cheap pessimism;" that he, Miyazaki, couldn't say anything good about it; and that everything Tezuka had ever said about animation was all fundamentally wrong because of his over-infatuation with Walt Disney. In particular, Miyazaki resented the way Tezuka had advertised the merits of limited animation during the *Mighty Atom* years and later, when it suited him, trumpeted full animation. "Because of the example he set [with *Mighty Atom*], he created the subsequent curse of the animation industry, of constantly low production budgets."[121]

❍ ❍ ❍

As an artist, Tezuka found the questions he received from the mass media about *Mighty Atom* to be almost insufferable, sometimes implying that they nearly made him nauseous. The reality in Japan (as well as in other countries) is that most people know Mighty Atom primarily through TV animation and not manga, so that most fans of the work are not even aware of the depth and complexity of the original stories that Tezuka created. But in the hundreds upon hundreds of interviews that Tezuka gave in his life, he was usually asked questions by people who knew even less than the average fan and were only repeating stereotyped ideas that they had heard secondhand.

Tezuka was not only frustrated by the fact that his *Mighty Atom* series was so misunderstood, but that so much attention was put upon it. It was, after all, only one work out of hundreds that he created during his forty-year career, and, like an aging rock star always forced to sing the same single hit from decades past, he wanted people to also pay attention to his newer cre-

ations, or works that he felt might be equal in potential. He wanted, in other words, to be known for *more* than *Atom*. He achieved this in many circles with his manga-animation series *Janguru Taitei* (Jungle Emperor, or *Kimba the White Lion*); hugely popular in Japan, it is widely believed by fans to have heavily influenced (if not been outright plagiarized by) the Walt Disney Company's 1994 animated smash hit *The Lion King*. Similarly, Tezuka's manga-anime series *Black Jack*, about a charismatic, unlicensed physician, today rivals *Mighty Atom* in popularity. More mature and sophisticated manga readers are often in awe of his vast, sprawling exploration of reincarnation and the meaning of the cosmos in *Phoenix*, or his multifaceted, multi-national take on World War II and human destiny, *Adolf*.

Still, whenever non-manga readers interviewed Tezuka, at some point the subject always seemed to turn to *Mighty Atom*. In effect, Tezuka became a prisoner of his own success, for after *Mighty Atom* he became a brand—an instantly recognizable cartoonist, always wearing a beret and glasses, nearly deified in the public mind for having helped to make manga and anime full-fledged media of expression. And the symbol most associated with the brand was always Mighty Atom.

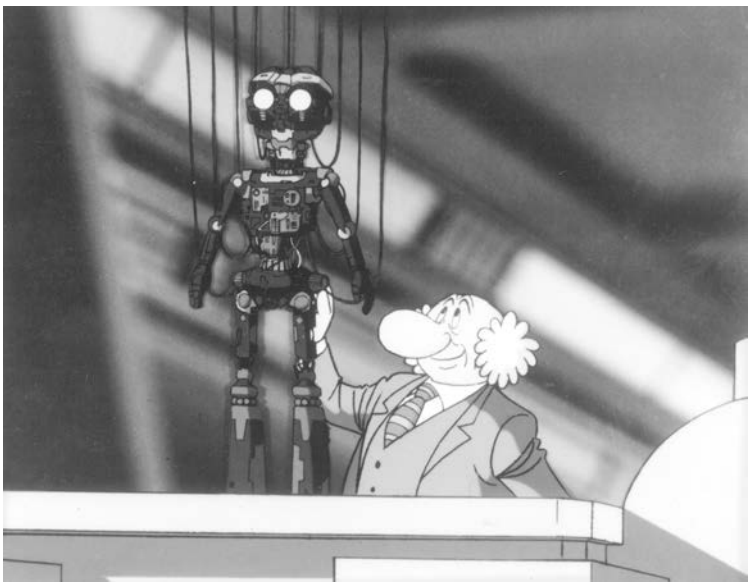
The truth of the matter is that Tezuka was a bit of a contrarian, liable to say things unexpected of him, and sometimes even contradicting things he had said previously. And he was always self-deprecating. No matter how much he complained about *Mighty Atom*, Tezuka was also intensely proud of the work. When young fans flocked to him in public (as they always did, since he was so recognizable), he never failed to oblige their requests for an autograph and more, usually drawing pictures of *Atom* as part of what he called his *fan sābisu*, or "fan service." Moreover, when traveling overseas later in life, he was always extremely gratified when people knew of him at all. Before his death in 1989, most people outside of Japan knew little about

Japanese manga and anime, and they usually did not know the names of any Japanese manga or anime artists. But when Tezuka was introduced as the creator of *Astro Boy* their eyes would invariably light up, and so would those of Tezuka.

❍ ❍ ❍

Around 1980 Tezuka asked me to review and write a report on his color remake of the *Mighty Atom* TV series. I spent several days confined in a room in the high-rise Shinjuku Prince hotel overlooking one of the busiest and most modern areas of crowded Tokyo, repeatedly watching videos. Outside, beneath my window, there were subways, surface trains, overpasses, and skyscrapers crisscrossing in a three-dimensional space; nearby shops overflowed with goods both high-tech and archaic; and on the streets there were businessmen, students, pimps, and young women bustling all about. To me it seemed a very *Mighty Atom* sort of environment, and it was indeed near the very area in which many of the original stories were set.

The "New Mighty Atom" series (author's translation), as it came to be called, consisted of fifty-two thirty-minute episodes made by Tezuka Productions with Nippon Television Network (NTV). It aired on the NTV network in Japan between October 1, 1980, and December 23, 1981, and it was essentially a remake of the original series, in color, with a larger budget and newer technology. Tezuka wanted me to view the films, give him my frank opinion and, from the perspective of an American, let him know which elements might be problematic for an American audience. Since I was hardly an expert on animation, it seemed like a great honor, and I remember diligently viewing tape after tape until I became bleary-eyed, and then (it being pre-word-processor days) writing a long report in Japanese, the top joint on my middle finger quickly developing calluses from gripping the pencil too tightly. I dutifully submitted the report



© Tezuka Productions

Scene from the 1980 Tetsuwan Atomu *TV series showing Professor Ochanomizu perfecting robots in his laboratory.*

and, without making a copy, today have very little memory of what I actually wrote. I do know that in some places I found the plot too complicated or the action overemphasized, and that I counseled against too much melodrama and against specific things that I felt a foreign audience might find off-putting. But many of my opinions may have reflected my personal tastes more than a truly objective assessment. Not being an expert on the original 1963 *Mighty Atom* show, I had at the time no way to compare the new show with the original, and that, of course, was not my assignment. And I was in no position to question why Tezuka wanted to remake his series.

In retrospect, the second series follows the stories in the first quite closely. It has the same basic plot structure, with Dr. Tenma creating an advanced robot to replace his dead son,

Tobio, then selling him to the circus because he doesn't grow, whereupon the robot is adopted by Professor Ochanomizu, given parents, and "raised" as Mighty Atom. Instead of being born in 2003 or 2013, in the new timeline Tezuka set Atom's birthday at 2030 to give the story a bit of breathing space for a new generation of viewers. Also, reflecting the interest in ecology in the 1980s, he changed Atom's source of energy from a regular fission-based atomic reactor to a more friendly, fusion-based one, which would presumably have fewer adverse effects on the environment (waste products would no longer remain radioactive for thousands of years). He brought back Mari Shimizu, the original voice of Atom in 1963, and several other people who had been involved in the old series. In a concession to fans of the 1963 series, composer Tatsuo Takai's immensely popular and bouncy opening melody was reused, but given a disco flavor.

Many of the old characters were redesigned to look slightly more "modern," and new characters were added. Atom's proportions were standardized to make him look younger and "cuter," and he is shown as a more introspective and vulnerable robot, but like many of the other characters he is still very recognizable from the original story. The biggest difference between the 1963 work and the 1980 version (other than the addition of color) is the addition of an evil nemesis robot, Atlas, with an "Omega" device that allows him to violate the Laws of Robots. Atlas is, therefore, even more human than Atom.

Also unlike the 1963 show, almost all the episodes were based on Tezuka's original manga stories instead of on scenarios by other writers. The addition of the character Atlas added a new tension to the show. That, along with a more introspective character for Atom, made the series considerably more somber and dark in tone than the original 1963 version, despite being in color. As with the first series, Tezuka deliberately tried to leave

out Japanese culturalisms that he thought foreigners might find off-putting, in hopes of reaching a foreign audience.

❍ ❍ ❍

As to the question of why Tezuka embarked on another *Mighty Atom* animated TV series, the first answer is that by the late seventies he had finally recovered from the bankruptcy of Mushi Productions. It had been nearly thirty years since he conceived of the *Mighty Atom* manga story, and seventeen years since he had made the 1963 black-and-white TV animation. With his other firm, Tezuka Productions, he was financially again able to make new animation.

By 1980, few TV stations in Japan would even deign to air an old black-and-white show, and home video recorders (which would have made the shows more accessible) were not yet as common as they are today. As a result—except for China, where that year the 1963 *Mighty Atom* series became one of the first Japanese animated works allowed to air—few children could enjoy the story on television. Moreover, in 1977 Tezuka had made the mistake of allowing another animation studio, Tōei Dōga, to create a shameless knockoff of *Mighty Atom*. Titled *Jetter Mars* and based on his ideas, it had been an embarrassment.

Lawyers had also finally cleared up some of the messy contracts with the original sponsors of the first *Mighty Atom* series, freeing Tezuka's new company to do new merchandising deals. The time indeed seemed right for a remake. In the same period, there was a revival and burst of remakes of many other popular early black-and-white TV-anime works, including *Mighty Atom*'s original archrival, *Ironman No. 28*. Being a highly competitive sort, Tezuka simply could not pass up the opportunity to update and recreate his *Mighty Atom* show in color.

In some basic "concept notes" Tezuka made before producing the new series, he writes that his goal was to go back and

rectify what he thought was lacking in the first series, or what he believed the mass media had misinterpreted. He wanted to include more references to social problems such as racial and social discrimination, to ecological and technological issues, and to add depth to the show. He emphasized that the theme of the previous show had mistakenly been switched to one emphasizing a "champion of justice," and become a "paean to a technological civilization" because of "lack of knowledge of the original manga stories on the part of the production staff, and the warped expectations of [Japanese] viewers during an era of booming economic growth." He insisted that the new show would be more faithful to his original manga stories, but he also wanted it to be more modern and based on a new concept.[122]

To that end, Tezuka was not as immediately involved in production of the new *Mighty Atom* show. He provided the original stories, codirected the first episode, and drew storyboards for the first, twenty-sixth, and forty-sixth episodes, but for most of the series, he stepped back and left the direction up to Noboru Ishiguro. For Ishiguro, the task of remaining faithful to Tezuka's original stories while creating something new must have been quite nerve-wracking. By 1980 Tezuka had been nearly deified in the Japanese mind, so even if Ishiguro were given considerable latitude, in the hierarchical nature of Japanese production he would not have had much room to maneuver.

Unlike the original animation series, with the new show Tezuka was careful to avoid a controversial ending and deliberately did not kill off his little robot character. This not only made fans happy, but left open the possibility of more *Atom* animation in the future. As Tezuka wrote in the October 1982 issue of Japan's *Popular Science*, he hoped one day to write other stories about the problems of robots and humans, not twenty or thirty years but one hundred years in the future.[123]

It would be unfair to say that the new series was a flop in

Japan, since it continued for 52 episodes, but it was definitely not a hit. It was dubbed into English for broadcast in the Australian and Canadian markets, but in the United States it received virtually no exposure and it is safe to say that few people saw it on air. And many of those who did see it could not help but be disappointed, especially if they were fans of the original black-and-white show. Fred Patten—one of the pioneering American fans of Japanese animation and a frequent writer on the subject—wrote:

> In the color TV series, practically every episode seems heavy with overhanging doom. . . . Atom's increased realism has turned him into a little boy who is timid and insecure despite his super-strength. Instead of momentarily grieving at a tragic climax, he constantly agonizes over the victims that he may not be able to save—and far too many episodes do end with a sympathetic supporting character gasping a final farewell. Atom has become a super-wuss![124]

I knew Tezuka fairly well around this time and, in retrospect, he seemed to give little public attention to the new *Mighty Atom* animation series, or even talk about it much in private. In fact, in a rare, long article he wrote about the series in 1982, it is clear that he was not at all happy with the result. Even factoring in his tendency to be self-deprecating, the article is like a great sigh of lament, at times verging on an extended whine, complaining about everything down to and including the reworked theme song. It is a somewhat surprising tone given that the new series was created by Tezuka's company, and thus ultimately his own responsibility.

Tezuka's biggest complaint was that he had been unable to get his own staff to understand what he had wanted them to do. They "created an Atom that was too much of a goody

two-shoes," he wrote, "probably because they could not free themselves from the image they had of the old series. . . . As a result, in this day and age of anime when it's possible to depict anything, Atom comes off seeming old-fashioned." By 1980, more adult and action-oriented robot anime shows such as the *Gundam* series were all the rage, so Tezuka had hoped that the remade *Atom* show could be a counterweight to them. He wanted the show to appeal to a younger audience, to be something more along the lines of Akira Toriyama's then hugely popular manga series, *Dr. Slump*, later to become the very cute and endearing *Arare-chan* anime series, about a little girl robot. Nonetheless, he again complained, the staff had been unable to understand his intent and turned the show into a more action-oriented, adult work. As if that were not enough, he grumbled that the scenario writers had not been able to properly realize his vision of Atom's nemesis, Atlas, and—instead of turning him into a Darth Vader-style character—had made him a tragic, weak figure.[125]

In reality, Tezuka simply did not have enough time to follow the production of the new *Mighty Atom* series as closely as he should have. It was not on the top of his priority list. He was more interested in creating *new* works than in reworking old ones. And he was therefore continuing, in his super-productive way, to write and draw many other manga stories, cranking out over a hundred pages a month. In the same time frame as the new *Mighty Atom* TV series, he was serializing a manga story about cute unicorns titled *Unico* (as well as a few short, mostly forgettable *Mighty Atom* pieces) in magazines for small children. In magazines for adult audiences, he was drawing his lengthy biography of *Buddha*, and his self-proclaimed "lifework," the cosmic epic known as *Phoenix*. And he was creating other animated works and traveling to various countries around the world as Japan's first goodwill manga ambassador. The remake of *Mighty*

Photograph © 1981 Frederik L. Schodt

Tezuka drawing a huge image of Atom in front of an adoring crowd at Kobe City's Portopia Exposition in the summer of 1981.

Atom was merely one element in the whirlwind of his perpetually spinning, imaginative mind.

Other than a few isolated illustrations, after 1981 Tezuka did no work to speak of on *Mighty Atom*, in either manga or animated format, until his death. From mid-1986 until the beginning of 1987, however, he serialized a work called *Atom Cat* in the young children's monthly *Niko Niko.* Inspired by the *Mighty Atom* series, it represented Tezuka's final attempt to rework his *Atom* story in a more creative way, into something for smaller children. It starred a cute, abandoned cat that, after an accident, is made by aliens into a *Mighty Atom*–style cyborg—a super cat. The story ended after half a year, when the magazine ceased publication.

❍ ❍ ❍

Tezuka's fame in Japan was of course based on far more than *Mighty Atom*, and with each passing year it only seemed to increase as the manga and anime culture that he had helped spawn matured and flourished. In the eighties he collected more and more awards and accolades, but rather than rest on his laurels, he continued with his blitzkrieg-like schedule, remaining on the front lines of the business and competing head-on with the younger artists who were continually challenging him. He immersed himself in the production of other manga and animation works, the latter both commercial (for television and theaters) and "experimental." He spent a great deal of time traveling the world as a representative of Japan's growing manga-anime culture and making public appearances, but he still managed to draw or write or think late at night in hotels or planes or even cars. He usually slept only three or four hours a day, and that often in the form of catnaps. I had the opportunity to accompany him on some of these trips in North America and personally watched him wear people several decades younger, who sometimes accompanied him, almost into the ground.

Tezuka once stated his intention to keep working into his eighties, but it was a hope more than anything else. He was a physician (and thus presumably capable of monitoring his health), and he seemed to have good genes; his father survived the war and lived to be eighty-six. Yet even Tezuka was unable to fend off the forces of nature. I did not see him the last year of his life, but in photographs in magazine and newspaper articles I noticed that he had lost a great deal of weight, and in the last notes he wrote me I was struck by the marked deterioration of his handwriting. For an artist who had always prided himself on his clean pen lines and—like the old Renaissance masters—on his ability to draw a nearly perfect circle freehand, it was shocking.

In Japan at the time, it was customary for medical authori-

ties not to tell patients if they had fatal diseases such as cancer, for fear that it would cause them to give up all hope and die prematurely. Despite the fact that Tezuka was himself a physician, and certainly had a good idea of what was happening to him, he participated fully in this charade, always pretending to be suffering from stomach ulcers or something else, when in fact he was dying of stomach cancer. He had one operation in March of 1988, in which two thirds of his stomach was removed, but he was discharged in May and tried to resume his normal work. He gave an interview, published in September, to his fan club magazine, in which he described his surgery and struggle to recover in an almost horrific level of medical detail.[126]

On October 1 and 2, a special "Mighty Atom Cultural Forum" was held in Tokyo to commemorate the twenty-fifth anniversary of the broadcast of the TV-animation series. In addition to film screenings, there were discussions by famous manga artists, roboticists, and other celebrities, but Tezuka did not attend. He did, however, contribute an essay to the program's notes, titled "Memories of Atom," in which he confessed that he had made the *Mighty Atom* TV series mainly to raise money to allow him to make experimental animation. It had been a huge financial and creative gamble, but had he not taken it, he noted with hint of pride, there not only would have been no *Mighty Atom* TV series, but probably no Japanese TV-animation industry either, at least as we know it today. The day after the forum he was admitted to the hospital again, but soon discharged. In November, he somehow managed to attend an animation festival in Shanghai.[127]

After Tezuka returned from China, on November 29, he gave another interview to his fan club magazine, in which he listed in great detail all the various projects he was still working on and his hopes for the coming year, but he mentioned that he might require more surgery. The magazine conducted the

interview by tape recorder, with Tezuka in a hospital bed, and published it with the comment that he "was still burning with the drive to create, in the midst of a schedule to which it would be difficult to adhere even if he were in good health." Tezuka may have been mulling over a *Mighty Atom*–related project, but there was no mention of one on the immediate horizon.[128]

In December, Tezuka had the surgery he dreaded at Tokyo's Hanzōmon hospital. While in his hospital bed, he worked on several serialized manga stories, including a semi-biographical work of Ludwig van Beethoven and his third adaptation of Goethe's *Faust*, which he titled *Neo-Faust*. As usual, his company sent out calendars for the coming year, each month graced with illustrations of famous Tezuka characters. For the first time in years, Mighty Atom had the cover all to himself and was shown blasting into space.

Tezuka died on February 9, 1989, at the age of sixty, but up until the very end he kept his pens and paper by his bedside. His last words, according to his wife, Etsuko, were "Please, please let me continue to work. . . ."[129]

Afterword

Had Tezuka lived, would he have attempted yet another remake of *Mighty Atom*, either in manga or anime form? We will never know for certain, but given his personality and the enduring popularity of the original story, it is highly likely. One of the most intriguing rumors circulating in the Japanese manga industry is that Tezuka planned to merge the *Mighty Atom* characters into a final volume of his beloved life work, the *Phoenix*. Because the *Phoenix* is a three-thousand-plus-page epic about reincarnation, life, birth, and the meaning of the cosmos (alternating from the past to the future and converging on the present), there is a nice symmetry to this idea. Tezuka Productions archivist Haruji Mori, who is in a better position than most to know of such matters, strongly believes the rumor to have been true, for it is an idea that Tezuka himself mentioned in interviews dating back to 1967. But at this point, Tezuka's true intentions can only be speculated upon.[130]

What is certain is that both Tezuka's Mighty Atom character and the core stories that he created around him will

continue to have a very long life. As described at the beginning of this book, the year 2003—when Mighty Atom was supposedly "born" in the original story line—saw Japan awash in Mighty Atom merchandise, events, video games, new manga serializations, and even a new animated TV series, titled *Astro Boy/ Tetsuwan Atom*. The animated show, with over fifty episodes, had a higher budget than most TV shows and flashy visuals but did not catch fire in Japan, and ratings were stuck at around 11 percent, as opposed to the nearly 40 percent of the 1963 original. Yet it must be kept in mind that in 1963 there were no other competing Japanese animation programs on air and now the world is awash in them. Like the original series, the 2003 series was quickly exported to the United States and broadcast on the Kids' WB channel, but it was given a poor time slot, did not do well, and was soon canceled.

Starting around 1998, I was involved for some time as an interpreter in negotiations for a new *Astro Boy* feature film, to be made by Columbia/Sony Pictures. For the next eight years there was great anticipation in the global Mighty Atom/Astro Boy–fan community over this film, at one point said to involve the Jim Henson Company and a variety of big-name Hollywood actors, and to use both puppets and computer graphics to recreate the Astro Boy world in an entirely new and exciting fashion. Later it was even announced that award-winning director Genndy Tartakovsky would head the project. But all came to naught when Sony Pictures let its option to produce the film expire in 2006. According to one source, the project never reached fruition because Tezuka Productions and Columbia could never agree on the screenplay, Tezuka Productions being especially sensitive about how American screenwriters might reinterpret a national icon of Japan. Another theory is that Steven Spielberg's somewhat derivative 2001 theatrical feature, *A.I.*—also about an android boy sold to the circus—had eroded market demand for

an *Astro Boy* feature. Whatever the case may be, after Sony Pictures let its option expire, another company, the Hong Kong-based Imagi International, picked up the rights with the intention of making a full computer-graphics version for release in 2009.

Photograph © 1981 Frederik L. Schodt

Author with Tezuka, summer of 1981.

Tezuka of course had nothing to do with the 2003 *Astro Boy/Tetsuwan Atomu* blitz, but even if he had been alive, he probably would have found lots to dislike in the new animation series, or even in a new feature film if it had been made. I saw one of the first computer-graphics features—Disney's 1982 groundbreaking *TRON*—with Tezuka in California. In my mind I can still hear his voice after we came out of the theater, complaining not only how dark the movie was, but also how he thought that computer graphics would never be able to compete with line drawing and traditional cel animation for warmth and originality. Of course, at the time he could never have imagined how sophisticated computer graphics would become, or how they would eventually be able to mimic the human quality of human animators. It is likely that he would have resisted the idea of using computer graphics unless someone could have shown him how it could enhance his storytelling skills.

What Tezuka would have been looking for, I am quite certain, is a new, clever interpretation of his original stories. In the first decade or so after his death, that was nearly impossible given the status that he—and *Mighty Atom*—had acquired. In Japan, at least, it was difficult for younger animators to feel free

with Tezuka's work as long as he was alive, simply because he was such a nationally revered person and Mighty Atom had become a national icon. But it was also because they were over-fixated on the style and stories that Tezuka had already created (and with which they had been raised). Even after Tezuka's death, the pressure on anyone in Japan attempting a reinterpretation of *Mighty Atom* is not to be underestimated. Not only does Tezuka's family have a vested interest in a faithful portrayal of the character, but at this point there is also a vast commercial network of franchisees whose financial well-being could potentially be affected. And of course there are now multiple generations of *Mighty Atom* fans, both in Japan and around the world, to whom anyone attempting a reinterpretation must listen carefully.

Producing theatrical features or television animation is ultimately an exercise in compromise, as it requires that many people and entities be involved, from screenwriters and artists to licensees and advertising agencies. A truly creative reinterpretation of the *Mighty Atom* stories is therefore likely to come from outside the committee-like production system often used for film or television, and instead come from the ranks of those who can work as individuals, with greater freedom, such as novelists, manga artists, or even fine artists.

One of the first and most intriguing signs of this happening occurred during all the *Mighty Atom* hoopla of 2003, when Japanese manga artist Naoki Urasawa began serializing a story titled *Pluto* in the middle-aged-male-oriented biweekly manga magazine, *Big Comic Original*. Urasawa is one of the best of a new generation of Japanese manga artists, with a highly realistic but unique art style, the author of recent best-sellers including *Yawara*, a series about a young girl judo star, and the long-running *Monster*, a fugitive thriller set in modern Germany. Urasawa himself grew up reading Tezuka's manga and watching anime, and one of his all-time favorite works was *Mighty Atom*,

Photograph © 1981 Frederik L. Schodt

Osamu Tezuka's unassuming gravestone in Tokyo, 2007, with his most famous characters engraved upon it.

specifically the 1964–65 episode titled "The Greatest Robot on Earth." Because of this connection, in the fall of 2002 Urasawa approached Macoto Tezuka—the son of Osamu Tezuka, currently on the board of directors of Tezuka Productions (as well as an artist in his own right). His idea was to create and serialize a novel-like manga story based on Tezuka's single episode. Given all the exposure that the Mighty Atom property was receiving leading up to the 2003 birthday celebrations, Macoto was at first reluctant to agree to a remake of his father's work by another artist. He turned down Urasawa once, but then—after finally agreeing to meet him and hear him out—realized the

potential of what he was trying to do, and agreed. To his credit, Macoto agreed on the condition that Urasawa not create a mere homage or parody, but do something truly original.

Working with his producer, Takashi Nagasaki, and with Macoto Tezuka acting as a supervising editor, Urasawa completely recast Tezuka's episode. Instead of Mighty Atom, he told the story from the viewpoint of the Europol detective Gesicht, another robot in the original story, and had Mighty Atom appear only in a side role. Drawing in a highly realistic style utterly unlike that of Tezuka's, he set the story in Europe, in the near future, and turned it into a suspense-filled thriller. After serializing the story for many months in the magazine (as is common in Japan), the work was then compiled into paperbacks and began attracting a great deal of attention, not only among older fans of *Mighty Atom*, but among a whole new generation of manga readers. In 2005 it won the *Asahi shimbun*'s prestigious Osamu Tezuka Culture Award, and a major publisher began issuing it as a beautifully designed deluxe paperback series. Each volume was packaged with something related to the original Tezuka story—a reprint of the original Tezuka manga, a copy of a manga story that Urasawa had created in his notebook in ninth grade (emulating Tezuka's style, with Mighty Atom doodles in the margins), or a replica of the Mighty Atom candy freebies popular in the 1960s. As of this writing, Urasawa was still serializing his work. Eventually, someone will probably make an animated or live-action film based on it.

Even if there are no new *Mighty Atom* manga or films created, the Mighty Atom character alone has become a permanent fixture of both Japanese and global pop culture. Punk bands in Japan sing songs dedicated to Mighty Atom, and in North America hip-hop groups like Digable Planets incorporate mentions of him in their lyrics. Conceptual artists like Takashi Murakami and sculptors like Kenji Yanobe also seem to have a soft

spot in their hearts for Mighty Atom, finding his cute humanoid-robot-machine identity a constant source of inspiration. And it is not just artists, but ordinary people as well. A quick search of the Web in 2007 reveals a mini-cult of people who like to place Astro Boy dolls in various sightseeing spots around the world and photograph them. There is simply something about Mighty Atom's iconic design that appeals to and inspires people.

Tezuka's original *Mighty Atom* manga stories, for that matter, are unlikely to disappear any time soon. Tezuka created many different well-known works, and when one of them happens to be made into a popular TV show or a theatrical feature in Japan, sales of that work in paperback tend to eclipse all others. In 2006, for example, paperbacks of Tezuka's medical-themed *Black Jack* manga outsold his others, mainly because of the huge success of a new TV-animation series that year. The following year saw a surge in sales of *Dororo* when it was made into a live-action movie. But Atom still has the greatest recognition of all of Tezuka's manga characters. *Mighty Atom*–related merchandise, reinterpreted with "classic" designs and pseudo-Italian designs, sells well. Japanese readers continue to purchase huge numbers of *Mighty Atom* paperback books, many of them a new generation discovering Tezuka's stories about his little robot character for the first time. Even older readers are going back, not just out of nostalgia but to read the stories from a new, adult perspective. And when they do, they often discover stories that are surprisingly fresh, and shockingly original.

Among the flood of *Mighty Atom*–themed books that appeared in Japan in 2003, one of the more provocative was a little-noticed work titled *Tezuka Osamu no daiyogen* (Osamu Tezuka's Grand Prophesy), by Tatsurō Kuzumi and the Secret Japan Robot Literature Institute. With the intriguing subtitle (in translation) of "The Shocking Twenty-first Century Revealed in *Mighty Atom* and *Phoenix*," it purported to show that Tezuka's

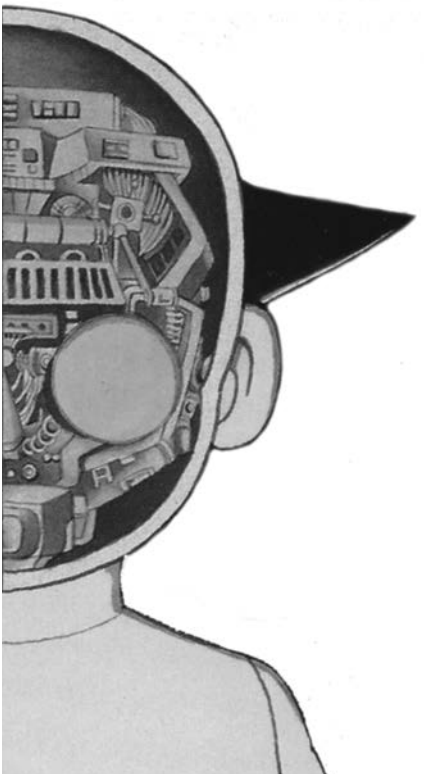
early books contained actual prophesies that apply to the world we live in today. In various *Mighty Atom* episodes, Kuzumi saw warnings about the September 11 terrorist attacks, the suspected chemical weapons that caused the invasion of Iraq and downfall of Saddam Hussein, an increase in credit-card bankruptcies among youth, and a possible bankruptcy of Disneyland in the future. In the purple prose characteristic of this over-the-top genre of books in Japan, the author wrote:

> Tezuka's works seemed to form a stack as high as Mt. Everest, and the more I read them, the more I ran up against profound mysteries that sent chills down my spine. . . . [I came to the conclusion] that Osamu Tezuka—the great genius, the great scientist, and the unparalleled manga artist of the twentieth century—was in fact a prophet who equaled, in fact surpassed, even vastly surpassed, that famous sixteenth-century prophet, Nostradamus![131]

Depending on the predilection of the reader, in Japan a book in Kuzumi's hyperventilated style can be taken seriously or as tongue-in-cheek. But in reading many of Tezuka's original *Mighty Atom* episodes today, it is hard not to be amazed at the issues that he was raising nearly half a century ago in the context of a comic book for young boys. Whether it was discrimination, technology, or even (as in the episode "Robot Bombs") tales about the twenty-first-century problem of suicide bombers, there is material that even adults today can find provocative and stimulating.

Tezuka's *Mighty Atom* stories thus do more than give us a peek at the way a remarkable man triggered Japan's manga-anime revolution. They also encourage us to look at the world in a different way, and that alone will guarantee that they will live on, as both a source of entertainment and inspiration.

Appendix A
Appendix B
Notes
Bibliography
Index



Appendix A: Japanese and English Manga Titles

The following tables contain all of Tezuka's *Mighty Atom* manga stories that were compiled into Akita Shoten's Sunday Comics edition and the identical Dark Horse English-language *Astro Boy* series. These stories were originally serialized in the monthly *Shōnen* (Boys) magazine, *Shōgaku ninensei* (Second Grader) magazine, *Shōnen janpu* (Boys' Jump), *Tetsuwan Atomu kurabu* (Mighty Atom Club), *Sankei shimbun* (Sankei newspaper), and a variety of other miscellaneous Japanese periodicals. The works are arranged by periodical, in order of publication date. In instances where multiple volumes are listed, the abbreviation "DH" indicates a different volume number in the Dark Horse series.

Shōnen (Boys)

No.	*Japanese Title/ Romanized Title*	*English Title (Author Translation)*	*Original Serialization/Publication Date*	*Sunday Comics/ Dark Horse Vol. Nos.*
1	アトム大使 *Atomu Taishi*	Ambassador Atom	*Apr. 1951–Mar. 1952*	*15*
2	気体人間 *Kitai ningen*	Gas People	*Apr. 1952–Oct. 1952*	*15*
3	フランケンシュタイン *Furankenshutain*	Frankenstein	*Nov. 1952– Apr. 1953*	*21*
4	赤いネコ *Akai neko*	Red Cat	*May 1953–Nov. 1953*	*16*
5	海蛇島 *Umi hebi jima*	Sea-Serpent Island	*Aug. 1953 (supplement)*	*21*
6	火星探検 *Kasei tanken*	Mission to Mars	*Dec. 1953–May 1954*	*21*
7	コバルト *Kobaruto*	Cobalt	*June 1954–Sep. 1954*	*9*
8	サンゴ礁の冒険 *Sangoshō no bōken*	The Coral Reef Adventure	*July 1954 (expanded summer edition)*	*21*

9	*ZZZ 総統* *ZZZ Sōtō*	Führer ZZZ	*Sep. 1954–Dec. 1954*	*17*
10	電光人間 *Denkō ningen*	Electro	*Jan. 1955 (supplement)*	*15*
11	ゲルニカ *Gerunika*	Gernica	*1955 (expanded New Year's edition)*	*14*
12	若返りガス *Wakagaeri gasu*	Youth Gas	*Feb. 1955–Sep. 1955*	*12*
13	冷凍人間 *Reitō ningen*	The Frozen Human	*July 1955 (supplement)*	*17*
14	黄色い馬 *Kiiroi uma*	Yellow Horse	*Oct. 1955–Feb. 1956*	*10*
15	アルプスの決闘 *Arupusu no kettō*	Shoot-Out in the Alps	*Jan. 1956 (supplement)*	*13*
16	アトラス *Atorasu*	Atlas	*Mar. 1956–July 1956*	*18*
17	ミドロが沼 *Midoro ga numa*	The Midoro Swamp	*Aug. 1956–Nov. 1956*	*16*
18	テストパイロット *Tesuto pairotto*	The Test Pilot	*Sep. 1956 (supplement)*	*21*
19	ロボット爆弾 *Robotto bakudan*	Robot Bombs	*Dec. 1956–Aug. 1957*	*21*
20	幽霊製造機 *Yūrei seizōki*	Ghost Manufacturing Machine	*Jan. 1957 (supplement)*	*4*
21	ブラック・ルックス *Burakku Rukkusu*	Black Lux	*Sep. 1957 (supplement)*	*15*
22	ふしぎなボール *Fushigi na bōru*	The Mysterious Ball	*Oct. 1957–Dec. 1957*	*18*
23	スーパー旋風 *Supā senpū*	Super Cyclone	*Dec. 1957 (supplement)*	*21*
24	十字架島 *Jūjikajima*	Crucifix Island	*Jan. 1958–Apr. 1958*	*5*
25	天馬族の砦 *Tenmazoku no toride*	Fortress of the Centaurs	*May 1958–July 1958*	*14*
26	マッドマシーン *Maddo mashīn*	Mad Machine	*Aug. 1958–Sep. 1958*	*3*
27	コウモリ伯爵 *Kōmori Hakushaku*	Count Bat	*Sep. 1958–Jan. 1959*	*18*

28	キリストの目 *Kirisuto no me*	The Eyes of Christ	*Jan. 1959 (supplement)*	*12*
29	イワンのばか *Iwan no baka*	Ivan the Fool	*Feb. 1959–Mar. 1959*	*4*
30	エジプト陰謀団の秘密 *Ejiputo inbōdan no himitsu*	The Secret of the Egyptian Conspirators	*Apr. 1959–Aug. 1959*	*9*
31	人工衛星*SOS* *Jinkō eisei SOS*	S.O.S. from a Satellite	*July 1959 (expanded summer edition)*	*18*
32	ガデム *Gademu*	Gademu	*Aug. 1959–Sep. 1959*	*17*
33	地底戦車 *Chitei sensha*	Subterranean Tanks	*Oct. 1959–Nov. 1959*	*11*
34	人口太陽球 *Jinkō taiyō kyū*	The Artificial Sun	*Dec. 1959–Feb. 1960*	*5*
35	宇宙ヒョウ *Uchū hyō*	Space Snow Leopard	*Feb. 1960–Apr. 1960*	*5*
36	透明巨人 *Tōmei kyojin*	The Invisible Giant	*May 1960–July 1960*	*9*
37	ロボット流し *Robotto nagashi*	A Day to Remember	*1960 (expanded summer edition)*	*4*
38	ウランちゃん *Uran–chan*	Uran	*Aug. 1960–Sep. 1960*	*14*
39	デッドクロス殿下 *Deddokurosu Denka*	His Highness Deadcross	*Sep. 1960–Dec. 1960*	*2*
40	白熱人間 *Hakunetsu ningen*	The White-Hot Being	*Jan. 1961–Mar. 1961*	*14*
41	植物人間 *Shokubutsu ningen*	Plant People	*1961 (expanded New Year's edition)*	*1*
42	ホットドッグ兵団 *Hotto doggu heidan*	The Hot Dog Corps	*Mar. 1961–Oct. 1961*	*1*
43	溶鉱炉の怪人 *Yōkōro no kaijin*	Phantom of the Blast Furnace	*1961 (expanded summer edition)*	*11*
44	第三の魔術師 *Daisan no majitsushi*	The Third Magician	*Oct. 1961–Jan. 1962*	*2*
45	宇宙の寄生虫 *Uchū no kiseichū*	Space Parasites	*Jan. 1962–Apr. 1962*	*17*

46	ロボットランド *Robotto rando*	Robot Land	*May 1962–Sep. 1962*	*4*
47	アトム対ガロン *Atomu tai Garon*	Atom vs. Garon	*Oct. 1962–Feb. 1963*	*10*
48	白い惑星 *Shiroi wakusei*	White Planet	*1963 (expanded New Year's edition)*	*2*
49	悪魔のハチ *Akuma no hachi*	Demon Bees	*Mar. 1963–June 1963*	*14*
50	ロボット宇宙艇 *Robotto uchūtei*	The Robot Spaceship	*July 1963–Dec. 1963*	*18*
51	悪魔の風船 *Akuma no fūsen*	The Devil's Balloons	*Dec. 1963–Feb. 1964 (supplement)*	*16*
52	地球最後の日 *Chikyū saigo no hi*	The Last Day on Earth	*Mar. 1964–June 1964*	*11*
53	地上最大のロボット *Chijō saidai no robotto*	The Greatest Robot on Earth	*June 1964–Jan. 1965*	*3*
54	ロボイド *Roboido*	Roboids	*Jan. 1965–May 1965*	*12*
55	ロビオとロビエット *Robio to Robietto*	Robio and Robiette	*May 1965–Sep. 1965*	*16*
56	青騎士 *Aokishi*	Blue Knight	*Oct. 1965–Mar. 1966*	*19*
57	アトム復活 *Atomu fukkatsu*	Atom Reborn	*Mar. 1966–May 1966*	*19*
58	メラニン一族 *Meranin ichizoku*	The Melanin Tribe	*June 1966–Aug. 1966*	*20*
59	ミーバ *Mība*	Meeva	*Sep. 1966–Dec. 1966*	*20*
60	顔のないロボット *Kao no nai robotto*	The Faceless Robot	*Jan. 1967–Feb. 1967*	*8*
61	一億年前の犯罪 *Ichiokunenmae no hanzai*	The 100-Million-Year-Old Crime	*Mar. 1967–Apr. 1967*	*10*
62	ゾロモンの宝石 *Zoromon no hōseki*	Zolomon's Jewels	*May 1967–Dec. 1967*	*13*
63	火星から帰ってきた男 *Kasei kara kaette kita otoko*	The Man Who Returned from Mars	*Jan. 1968–Mar. 1968*	*11*

Shōgaku ninensei (Second Grader)

No.	*Japanese Title/ Romanized Title*	*English Title (Author Translation)*	*Original Serialization/Publication Date*	*Sunday Comics/ Dark Horse Vol. Nos.*
1	ロボット処理車 *Robotto shorisha*	Robot Disposer	*Sep. 1980*	*Xtra vol. 2/ (DH) vol. 23*
2	フランケン *Furanken*	Franken	*Oct. 1980*	*Xtra vol. 2/ (DH) vol. 23*
3	アトム対アトラス *Atomu tai Atorasu*	Astro vs. Atlas	*Nov. 1980*	*Xtra vol. 2/ (DH) vol. 23*
4	小ぞうプーラ *Kozō Pūra*	Pula the Baby Elephant	*Dec. 1980*	*Xtra vol. 2/ (DH) vol. 23*
5	ロボットギネス *Robotto ginesu*	Guinness Book Robots	*Jan. 1981*	*Xtra vol. 2/ (DH) vol. 23*
6	暴走ロボット *Bōsō robotto*	The Berserk Robot	*Feb. 1981*	*Xtra vol. 2/ (DH) vol. 23*
7	磁石ロボット *Jishaku robotto*	The Magnet Robot	*Mar. 1981*	*Xtra vol. 2/ (DH) vol. 23*
8	ジャイアント　ウラン *Jaianto Uran*	Giant Uran	*Apr. 1981*	*Xtra vol. 2/ (DH) vol. 23*
9	宇宙人のお人形 *Uchūjin no oningyō*	Space Doll	*May 1981*	*Xtra vol. 2/ (DH) vol. 23*
10	砂漠の幽霊 *Sabaku no yūrei*	Ghosts in the Desert	*June 1981*	*Xtra vol. 2/ (DH) vol. 23*
11	宇宙の虫 *Uchū no mushi*	The Space Bug	*July 1981*	*Xtra vol. 2/ (DH) vol. 23*
12	おかしなアヒル *Okashina ahiru*	Crazy Duck	*Aug. 1981*	*Xtra vol. 2/ (DH) vol. 23*
13	ねこのまもり神 *Neko no mamorigami*	A Feline Guardian Diety	*Sep. 1981*	*Xtra vol. 2/ (DH) vol. 23*
14	スペースシャトル *Supēsu shatoru*	The Space Shuttle	*Oct. 1981*	*Xtra vol. 2/ (DH) vol. 23*
15	富士山の決闘 *Fujisan no kettō*	Showdown on Mt. Fuji	*Dec. 1981*	*Xtra vol. 2/ (DH) vol. 23*

Tetsuwan Atomu kurabu (Mighty Atom Club)

No.	*Japanese Title/ Romanized Title*	*English Title (Author Translation)*	*Original Serialization/Publication Date*	*Sunday Comics/ Dark Horse Vol. Nos.*
1	悪役たちのロボット *Akuyakutachi no robotto*	Bad-Guy Robots	*Aug. 1964*	*Xtra vol. 1/ (DH) vol. 22*
2	うそつきロボット *Usotsuki robotto*	The Lying Robot	*Sep. 1964*	*13*
3	すりかえ頭脳 *Surikaezunō*	Brain Swap	*Oct. 1964*	*Xtra vol. 1/ (DH) vol. 22*
4	タイムマシーン *Taimu mashīn*	The Time Machine	*Nov. 1964*	*Xtra vol. 1/ (DH) vol. 22*
5	盗まれたアトム *Nusumareta Atomu*	Atom's Been Stolen!	*June 1965–Sep. 1965*	*10*
6	宇宙放送 *Uchū hōsō*	Broadcasts from Outer Space	*Dec. 1965–Jan. 1966*	*12*
7	人面岩 *Jinmengan*	The Face on the Cliff	*Feb. 1966–Mar. 1966*	*17*

Sankei shimbun (Sankei Newspaper)

Series No.	*Ep. No.*	*Japanese Title/ Romanized Title*	*English Title (Author Translation)*	*Original Serialization/Publication Date*	*Sunday Comics/ Dark Horse Vol. Nos.*
1		アトム今昔物語 *Atomu konjaku monogatari*	Once Upon a Time Atom Tales	*Jan. 24, 1967–Feb. 28, 1969*	
	1	矛盾のはじまり *Mujun no hajimari*	Beginning of the Contradiction		*6*
	2	地球生活第一課 *Chikyū seikatsu dai-ikka*	Living on Earth, 101		*6*
	3	ネバ2号誕生 *Neba 2 gō tanjō*	The Birth of Neva, #2		*6*
	4	ロボット・バローの物語 *Robotto Barō no monogatari*	Barō the Robot		*6*

	5	スカラの失踪 *Sukara no shissō*	Scara Disappears		*6*
	6	エネルギー・チューブ *Enerugii chūbu*	The Energy Tube		*6*
	7	ベトナムの天使 *Betonamu no tenshi*	The Angel of Vietnam		*6*
	8	1993年・夏 *1993 nen natsu*	The Summer of 1993		*7*
	9	ロボット・チルチルの危難 *Robotto Chiruchiru no kinan*	Robot Chiruchiru in Danger		*7*
	10	最後のエネルギー *Saigo no enerugī*	Atom's Energy Runs Out		*7*
	11	天馬博士 *Tenma Hakase*	Dr. Tenma		*7*
	12	ベイリーの惨劇 *Beirī no sangeki*	The Tragedy of Bailey		*7*
	13	アトム サーカスへ行く *Atomu sākasu e iku*	Atom Goes to the Circus		*7*
	14	宇宙からの生きたカビ *Uchū kara no ikita kabi*	Living Mold from Outer Space		*8*
	15	ロボット人権宣言 *Robotto jinken sengen*	A Declaration of Robot Rights		*8*
	16	アトム 小学校へ行く *Atomu shōgakkō e iku*	Atom Goes to Elementary School		*8*
	17	雪と共に去りぬ *Yuki to tomo ni sarinu*	Gone with the Snow		*8*
2	*1*	爆弾列車 *Bakudan ressha*	The Bomb Train	*Jan. 1, 1968*	*Xtra vol. 1/ (DH) vol. 22*

Miscellaneous Publications

No.	*Japanese Title/ Romanized Title*	*English Title (Author Translation)*	*Publication Name/ Original Publication Date*	*Sunday Comics/ Dark Horse Vol. Nos.*
1	わが名は百科 *Wa ga na wa Hyakka*	I Am Knowall	*Manga dokuhon* (Manga Reader), *Sep. 1964*	*Xtra vol. 1/ (DH) vol. 22*
2	ひょうたんなまず 危機一発 *Hyōtan namazu kiki ippatsu*	Slippery Catfish in Imminent Danger	*Sandē mainichi* (Sunday Mainichi), *Jan. 3, 1965*	*Xtra vol. 1/ (DH) vol. 22*
3	アトムの初恋 *Atomu no hatsukoi*	Atom's First Love	*Big komikku* (Big Comic), *Mar. 1969*	*Xtra vol. 1/ (DH) vol. 22*
4	アトムの最後 *Atomu no saigo*	The End of Atom	*Bessatsu shōnen magajin* (Boys' Magazine, Special Volume), *July 1970*	*Xtra vol. 1/ (DH) vol. 22*
5	アトム還る *Atomu kaeru*	Atom Returns	*Shōgaku yonensei* (Fourth Grader), *Apr. 1972–Sep. 1972*	*Xtra vol. 1/ (DH) vol. 21*
6	アトム二世 *Atomu Nisei*	Atom II	*Bungei shunjū derakkusu* (Bungei Shunjū Deluxe), *Sep. 1975*	*Xtra vol. 1/ (DH) vol. 22*
7	おまえが犯人だ! *Omae ga hanninda!*	You're Guilty!	*Shūkan shōnen champion* (Weekly Boys' Champion), *Mar. 10, 1975*	*Xtra vol. 1/ (DH) vol. 22*
8	偏差値王国との対決 *Hensachi ōkoku to no taiketsu*	Showdown in the Standard Deviation Kingdom	*Shūkan Asahi* (Weekly Asahi), *Feb. 27, 1976*	*Xtra vol. 2/ (DH) vol. 22*
9	シルバー・タワー *Shirubā tawā*	The Silver Tower	*Shōnen janpu* (Boy's Jump) *(monthly)*, *Apr. 1976*	*Xtra vol. 1/ (DH) vol. 22*

Appendix B: Japanese and English Animation Episode Titles

The following are titles of the original 1963–65 Japanese *Mighty Atom* TV-animation episodes with broadcast dates and ratings, along with titles of equivalent U.S. *Astro Boy* episodes. Episode numbers for *Astro Boy* do not necessarily represent the U.S. broadcast order since the show was syndicated and individual stations sometimes showed them in different sequences. Episode numbers in the "U.S. *Astro Boy* Title" column refer to episode numbers in Right Stuf International's *Astro Boy Ultra Collector's Edition DVD Box Set*. Blank boxes in the "U.S. *Astro Boy* Title" column indicate episodes that were never aired in the U.S.

No.	*Japanese Title/ Romanized Title*	*Translated Title*	*Japan Broadcast Dates/Ratings*	U.S. *Astro Boy* Title
1	アトム誕生 *Atomu tanjō*	The Birth of Atom	*Jan. 1, 1963* *27.4%*	*Birth of Astro Boy (E1)*
2	フランケン *Franken*	Franken	*Jan. 8, 1963* *28.8%*	*Collosso (E2)*
3	火星探険 *Kasei tanken*	Mission to Mars	*Jan. 15, 1963* *29.6%*	*Expedition to Mars (E3)*
4	ゲルニカ *Gerunika*	Gernica	*Jan. 22, 1963* *32.7%*	*One Million Mammoth Snails (E14)*
5	スフィンクス *Sufuinkusu*	Sphinx	*Jan. 29, 1963* *34.2%*	*The Sphinx (E4)*
6	電光人間 *Denkō ningen*	Electro	*Feb. 5, 1963* *34.6%*	*Zero, the Invisible Robot (E7)*
7	アトム大使 *Atomu Taishi*	Ambassador Atom	*Feb. 12, 1963* *30.9%*	
8	幽霊製造機 *Yūrei seizōki*	Ghost Manufacturing Machine	*Feb. 19, 1963* *32.0%*	*The Spirit Machine (E10)*
9	ブラックルックス *Burakku rukkusu*	Black Lux	*Feb. 26, 1963* *34.3%*	*The Deep Freeze (E13)*
10	イワンの馬鹿 *Iwan no baka*	Ivan the Fool	*Mar. 5, 1963* *31.6%*	*Strange Voyage (E11)*

11	タイムマシン *Taimu mashin*	Time Machine	*Mar. 12, 1963* *35.1%*	*Time Machine (E18)*
12	十字架島 *Jūjikajima*	Crucifix Island	*Mar. 19, 1963* *29.8%*	*Cross Island (E5)*
13	キリストの目 *Kirisuto no me*	The Eyes of Christ	*Mar. 26, 1963* *28.6%*	*The Eyes of Christ*
14	人工太陽 *Jinkō taiyō*	The Artificial Sun	*Apr. 2, 1963* *32.5%*	*The Artificial Sun (E12)*
15	植物人間 *Shokubutsu ningen*	Plant People	*Apr. 9, 1963* *31.7%*	*Grass Boy (E6)*
16	白い惑星号 *Shiroi wakuseigo*	The White Planet	*Apr. 16, 1963* *27.3%*	*Silver Comet (E8)*
17	ロボットランド *Robotto rando*	Robot Land	*Apr. 23, 1963* *27.8%*	*Hullabaloo Land (E9)*
18	ガデム *Gademu*	Gadem	*Apr. 30, 1963* *22.4%*	*Gangor, the Monster (E15)*
19	アトム対魔神 *Atomu tai Majin*	Atom vs. Majin	*May 7, 1963* *23.5%*	*The Cosmic Giant (E19)*
20	気体人間 *Kitai ningen*	Gas People	*May 14, 1963* *21.7%*	*Toxor, the Mist Man (E20)*
21	人工衛星*R-45* *Jinkō eisei R-45*	Satellite R-45	*May 21, 1963* *21.6%*	*Satellite R-45 (E21)*
22	海蛇島 *Umihebijima*	Sea-Serpent Island	*May 28, 1963* *22.8%*	*Sea-Serpent Isle (E22)*
23	ミュータント *Myūtanto*	Mutant	*June 4, 1963* *28.3%*	*The Deadly Flies (E23)*
24	海底王国 *Kaitei ōkoku*	Undersea Kingdom	*June 11, 1963* *27.8%*	*Kingdom of the Sea (E24)*
25	地底戦車 *Chitei sensha*	Subterranean Tanks	*June 18, 1963* *24.4%*	
26	アトラス *Atorasu*	Atlas	*June 25, 1963* *24.3%*	*Don Tay's Infernal Machine (E26)*
27	パール星 *Pāru sei*	Pearl Planet	*July 2, 1963* *26.3%*	*Pearl People (E274)*
28	マッドマシン *Maddo mashin*	Mad Machine	*July 9, 1963* *26.3%*	*The Wacky Machine (E28)*
29	想い出の日 *Omoide no hi*	A Day to Remember	*July 16, 1963* *26.0%*	*Memory Day (E29)*

30	*ZZZ総統* *ZZZ Sōtō*	Führer ZZZ	*July 23, 1963* *26.6%*	*Secret Agent 3-Z (E16)*
31	黒い宇宙線 *Kuroi uchūsen*	Black Cosmic Rays	*July 30, 1963* *16.9%*	*Mysterious Cosmic Rays (E31)*
32	ホットドッグ兵団 *Hotto doggu heidan*	The Hot Dog Corps	*Aug. 6, 1963* *16.0%*	
33	三人の魔術師 *Sannin no majutsushi*	The Three Magicians	*Aug. 13, 1963* *19.1%*	*The Three Magicians (E33)*
34	ミドロが沼 *Midoro ga numa*	The Midoro Swamp	*Aug. 20, 1963* *26.2%*	*The Beast From 20,000 Fathoms (E34)*
35	人間牧場 *Ningen bokujō*	The Human Ranch	*Aug. 27, 1963* *28.2%*	*Planet X (E35)*
36	プイプイ教 *Pui pui kyō*	The Pui Pui Religion	*Sep. 3, 1963* *30.2%*	*The Elixir of Life (E36)*
37	ウランちゃん *Uran-chan*	Uran	*Sep. 10, 1963* *30.0%*	*The Strange Birthday Present (E25)*
38	狂った小惑星 *Kurutta shōwakusei*	Crazy Asteroid	*Sep. 17, 1963* *30.5%*	*The Asteroid Menace (E38)*
39	赤い猫 *Akai neko*	Red Cat	*Sep. 24, 1963* *35.7%*	*The Mysterious Cat (E39)*
40	ネオ・シーザー *Neo Shīzā*	Neo Caesar	*Oct. 1, 1963* *33.6%*	*The Abominable Snowman (E40)*
41	*X*爆弾 *X bakudan*	The X Bomb	*Oct. 8, 1963* *31.0%*	*Deadline to Danger (E41)*
42	黄色い馬 *Kīroi uma*	Yellow Horse	*Oct. 15, 1963* *28.2%*	
43	デッドクロス殿下 *Deddo Kurosu Denka*	His Highness Deadcross	*Oct. 22, 1963* *33.6%*	*Ditto (E43)*
44	エジプト陰謀団 *Ejiputo inbōdan*	The Secret of The Egyptian Conspirators	*Oct. 29, 1963* *37.3%*	*Cleopatra 1: Cleopatra's Heart (E44)*
45	クレオパトラの首飾り *Kureopatora no kubi kazari*	Cleopatra's Necklace	*Nov. 5, 1963* *34.5%*	*Cleopatra 2: Return of Cleopatra (E45)*

46	ロボット宇宙艇 *Robotto uchūtei*	The Robot Spaceship	*Nov. 12, 1963* *36.0%*	*The Phantom Spaceship (E46)*
47	宇宙ガニ *Uchū gani*	Space Crab	*Nov. 19, 1963* *33.5%*	*The Gigantic Space Crab (E47)*
48	天馬族 *Tenmazoku*	The Centaurs	*Nov. 26, 1963* *32.1%*	*The Great Space Horse (E48)*
49	透明巨人 *Tōmei kyojin*	The Invisible Giant	*Dec. 3, 1963* *33.9%*	*3D Tee Vee (E49)*
50	アトム西部へ行く *Atomu seibu e iku*	Atom Goes West	*Dec. 10, 1963* *31.1%*	*Westward, HA! (E50)*
51	子象プーラ *Kozō Pūra*	Pula the Baby Elephant	*Dec. 17, 1963* *30.4%*	*Jimbo, the Great (E51)*
52	雪ライオン *Yuki raion*	Snow Lion	*Dec. 24, 1963* *28.9%*	*Snow Lion (E52)*
53	アトムさよなら 1963年 *Atomu sayonara 1963 nen*	Atom, Sayonara, 1963	*Dec. 31, 1963* *31.2%*	
54	アルプスの決闘 *Arupusu no kettō*	Shoot-Out in the Alps	*Jan. 4, 1964* *31.2%*	
55	若返りガス *Wakagaeri gasu*	Youth Gas	*Jan. 18, 1964* *38.8%*	
56	地球防衛隊 *Chikyū bōeitai*	Earth Defense Squad	*Jan. 25, 1964* *40.3%*	*The Moon Monsters (E32)*
57	ロボット学校 *Robotto gakkō*	School for Robots	*Feb. 1, 1964* *37.5%*	*Astro Boy Goes to School (E37)*
58	13の怪神像 *13 no kaishinzō*	Thirteen Strange Statues	*Feb. 8, 1964* *36.9%*	*The Island of Mystery (E42)*
59	白熱人間 *Hakunetsu ningen*	The White-Hot Being	*Feb. 15, 1964* *36.8%*	*The Super Duper Robot (E30)*
60	悪魔の蜂 *Akuma no hachi*	Demon Bees	*Feb. 22, 1964* *34.8%*	*Dogma Palace (E53)*
61	宇宙の寄生虫 *Uchū no kiseichū*	Space Parasites	*Feb. 29, 1964* *35.5%*	

62	幽霊船 *Yūreisen*	Ghost Ship	*Mar. 7, 1964* *39.9%*	*The Haunted Ship (E17)*
63	人工氷山 *Jinkō hyōzan*	Man-Made Iceberg	*Mar. 14, 1964* *39.0%*	*The Man-Made Iceberg (E54)*
64	コウモリ伯爵 *Kōmori Hakushaku*	Count Bat	*Mar. 21, 1964* *36.2%*	*Vampire Vale (E55)*
65	勇敢な脱走者 *Yūkan na dassōsha*	The Brave Deserter	*Mar. 28, 1964* *37.1%*	*The Terrible Tidal Wave (E56)*
66	スペース・バイキング *Supēsu baikingu*	Space Vikings	*Apr. 4, 1964* *37.9%*	*The Vikings (E57)*
67	夜の勇士たち *Yoru no yūshitachi*	Warriors of the Night	*Apr. 11, 1964* *35.5%*	*The Devil Doll (E58)*
68	時計塔の秘密 *Tokeitō no himitsu*	Secret of the Clock Tower	*Apr. 25, 1964* *39.3%*	*The Clock Tower Mystery (E60)*
69	恐竜人の反乱 *Kyōryū no hanran*	Revolt of the Dinosaur People	*May 2, 1964* *35.9%*	*Dinosaur Dilemma (E59)*
70	ラフレシア *Rafureshia*	Rafleshia	*May 9, 1964* *37.0%*	*The Flower Monster (E61)*
71	地球最後の日 *Chikyū saigo no hi*	The Last Day on Earth	*May 16, 1964* *33.5%*	*Attack from Space (E62)*
72	宇宙漂流7日間 *Uchū hyōryū nanokakan*	Seven Days Drifting in Space	*May 23, 1964* *35.8%*	*Shipwreck in Space (E63)*
73	ビッグ・タイタン *Biggu Taitan*	Big Titan	*June 6, 1964* *36.2%*	*Big Titan (E64)*
74	地底探検 *Chitei tanken*	Subterranean Exploration	*June 13, 1964* *36.4%*	*Mission to the Middle of the World (E65)*
75	空とぶ町 *Sora tobu machi*	The Flying City	*June 20, 1964* *33.8%*	*Inca Gold Fever (E66)*
76	モンスター・マシーン *Monsutā mashīn*	Monster Machine	*June 27, 1964* *37.6%*	*The Monster Machine (E67)*
77	ケープ・タウンの子守唄 *Kēpu taun no komoriuta*	Capetown Lullabye	*July 4, 1964* *31.8%*	*The Hooligan Whodunnit (E68)*

78	50万年後の世界 *Gojūmannengo no sekai*	The World in 50,000 Years	*July 11, 1964* *30.0%*	*Funnel to the Future (E69)*
79	ドクター脳 *Dokutā Nō*	Doctor "Brain"	*July 18, 1964* *29.4%*	*Super Brain (E70)*
80	ヒューマノイド・ピル *Hyūmanoido Piru*	Pill the Humanoid	*July 25, 1964* *33.1%*	*A Mighty Minute (E71)*
81	夢みる機械 *Yume miru kikai*	The Dream Machine	*Aug. 1, 1964* *29.4%*	*The Dream Machine (E72)*
82	ロボット競技大会 *Robotto kyōgi taikai*	Robot Games	*Aug. 15, 1964* *31.0%*	*The Robot Olympics (E73)*
83	怪鳥ガルダ *Kaichō Garuda*	The Strange Bird, Garuda	*Aug. 22, 1964* *38.8%*	*Dunder, Bird of Doom (E74)*
84	イルカ文明 *Iruka bunmei*	Dolphin Civilization	*Aug. 29, 1964* *40.7%*	*Dolphins in Distress (E75)*
85	狂ったベルトウェイ *Kurutta berutouei*	The Crazy Beltway	*Sep. 5, 1964* *33.5%*	*The Mad Beltway (E76)*
86	時間銃 *Jikanjū*	The Time Gun	*Sep. 12, 1964* *36.3%*	*The Terrible Time Gun (E77)*
87	新かぐや姫 *Shinkaguyahime*	New Princess Kaguya	*Sep. 19, 1964* *38.2%*	*Space Princess (E78)*
88	細菌部隊 *Baikin butai*	Bacteria Brigade	*Sep. 26, 1964* *36.3%*	*Mighty Microbe Army (E79)*
89	ゴメスの亡霊 *Gomesu no bōrei*	The Ghost of Gomez	*Oct. 3, 1964* *38.2%*	*Horrible King Horrid (E80)*
90	ロボット砦 *Robotto toride*	Robot Fortress	*Oct. 10, 1964* *32.7%*	*Mystery of Amless Dam (E81)*
91	ガロン逆襲 *Garon gyakushū*	Garon Strikes Back	*Oct. 24, 1964* *31.4%*	*Galeom from Galaxy G (E82)*
92	ロボット三銃士 *Robotto sanjūshi*	The Three Robot Musketeers	*Oct. 31, 1964* *34.2%*	*The Three Robotiers (E83)*
93	コバルト *Kobaruto*	Cobalt	*Nov. 7, 1964* *40.0%*	*Brother Jetto (E84)*
94	アルプスの天使 *Arupusu no tenshi*	Angel of the Alps	*Nov. 14, 1964* *37.3%*	*Angel of the Alps (E85)*
95	魔のパンチカード *Ma no panchikādo*	Fiendish Punch-cards	*Nov. 21, 1964* *33.5%*	*Magic Punch Card (E86)*

96	ロボットヒューチャー *Robotto Hyūchā*	A Robot Named Future	*Nov. 28, 1964* *31.9%*	*The Great Rocket Robbery (E87)*
97	宇宙の対決 *Uchū no taiketsu*	Space Showdown	*Dec. 5, 1964* *34.2%*	*Contest in Space (E88)*
98	ゼオの遺産 *Zeo no isan*	Zeo's Treasures	*Dec. 12, 1964* *33.5%*	*Gift of Zeo (E89)*
99	小さなコロンブス *Chiisana Koronbusu*	The Little Columbus	*Dec. 19, 1964* *35.1%*	*A Deep, Deep Secret (E90)*
100	ロボット・ハウス *Robotto hausu*	Robot House	*Dec. 26, 1964* *33.0%*	*The Wonderful Christmas Present (E91)*
101	地図にない世界 *Chizu ni nai sekai*	An Uncharted World	*Jan. 2, 1965* *31.2%*	*Uncharted World (E92)*
102	魔境の女王 *Makyō no joō*	Queen of the Jungle	*Jan. 9, 1965* *34.0%*	*Jungle Mystery (E93)*
103	宇宙への階段 *Uchū e no kaidan*	Stairway to Space	*Jan. 16, 1965* *32.7%*	*The Terrible Spaceman (E94)*
104	悪魔の風船 *Akuma no fūsen*	The Devil's Balloons	*Jan. 23, 1965* *35.1%*	
105	アトム将軍 *Atomu Shōgun*	General Atom	*Jan. 30, 1965* *36.4%*	*General Astro (E96)*
106	宇宙から来た少年 *Uchū kara kita shōnen*	The Boy from Outer Space	*Feb. 6, 1965* *35.2%*	*The Mighty Mite from Ursa Minor (E95)*
107	地球解放 *Chikyū kaihō*	Liberating Earth	*Feb. 13, 1965* *36.4%*	*Mystery of the Metal Men (E97)*
108	サターン・マン *Satānman*	Saturn Man	*Feb. 20, 1965* *35.6%*	*Super Human Beings (E98)*
109	不死鳥 *Fushichō*	The Phoenix	*Feb. 27, 1965* *34.3%*	*Phoenix Bird (E99)*
110	水星探検 *Suisei tanken*	Expedition to Mercury	*Mar. 6, 1965* *37.6%*	*Menace from Mercury (E100)*
111	ロボット・ポリマー *Robotto Porimā*	A Robot Named Polymer	*Mar. 13, 1965* *32.2%*	

112	サムソンの髪の毛 *Samuson no kaminoke*	Samson's Hair	*Mar. 27, 1965* *35.3%*	
113	笑わぬバック国 *Warawanu bakku koku*	Bak, Land without Laughter	*Apr. 3, 1965* *34.8%*	*Dangerous Mission (E101)*
114	メトロ・モンスター *Metoro monstā*	Metro Monster	*Apr. 10, 1965* *39.1%*	
115	逃げ出した大金庫 *Nigedashita ōkinko*	The Vaults That Got Away	*Apr. 17, 1965* *35.4%*	
116	史上最大のロボット *Shijō saidai no robotto (1)*	The Greatest Robot on Earth (1)	*Apr. 24, 1965* *33.6%*	
117	史上最大のロボット *Shijō saidai no robotto (2)*	The Greatest Robot on Earth (2)	*May 1, 1965* *35.6%*	
118	ロボット・グラビー *Fobotto Gurabī*	A Robot Named Grabi	*May 8, 1965* *34.1%*	
119	空とぶレンズ *Sora tobu renzu*	The Flying Lens	*May 15, 1965* *31.6%*	*Planet 13 (E102)*
120	タイム・ハンター *Taimu hantā*	Time Hunter (remake of no. 11)	*May 22, 1965* *33.8%*	
121	ガニメート号 *Ganimēto gō*	A Spaceship Named Ganimete	*May 29, 1965* *38.5%*	*Prisoners in Space (E103)*
122	怪獣マントラー *Kaijū Mantorā*	Mantora the Monster	*June 5, 1965* *30.9%*	
123	ドッグ隊長 *Doggu Taichō*	Chief Dog	*June 19, 1965* *33.4%*	
124	置き土産 *Okimiyage*	The Gift Left Behind	*July 3, 1965* *30.6%*	*Double Trouble (E104)*
125	細菌を探せ *Saikin wo sagase*	Find the Bacteria!	*July 10, 1965* *30.2%*	
126	ロボイド *Roboid*	Roboid	*July 17, 1965* *32.3%*	
127	実験ロボット *Jikken robotto*	Experimental Robots	*July 24, 1965* *31.0%*	
128	インカ帝国の宝 *Inka teikoku no takara*	Treasures of the Incan Empire	*July 31, 1965* *28.8%*	
129	アトム対アトム *Atomu tai Atomu*	Atom vs. Atom	*Aug. 14, 1965* *27.4%*	

130	火星の嵐 *Kasei no arashi*	Martian Storm	*Aug. 21, 1965* *34.4%*	
131	ムーン・チャンピオン *Mūn chanpion*	Moon Champion	*Aug. 28, 1965* *31.9%*	
132	ルイ王子 *Rui Ōji*	Prince Louis	*Sep. 4,1965* *36.9%*	
133	10年目の復讐 *Jūnen me no fukushū*	Revenge on the Tenth Year	*Sep. 11, 1965* *35.5%*	
134	脱出作戦 *Dasshutsu sakusen*	The Escape Strategy	*Sep. 18, 1965* *29.3%*	
135	ロボット犬バッキー *Robottoken Bakkī*	Bucky the Robot Dog	*Sep. 25, 1965* *33.4%*	
136	ジャガー警部 *Jaggā Keibu*	Inspector Jagar	*Oct. 2, 1965* *29.3%*	
137	小さなクーリイ *Chīsana kūrī*	Little Cooly	*Oct. 9, 1965* *29.4%*	
138	長い1日 *Nagai ichinichi*	A Long Day	*Oct. 16, 1965* *30.4%*	
139	盗まれたアトム *Nusumareta Atomu*	Atom's Been Stolen!	*Oct. 23, 1965* *32.6%*	
140	王様とアトム *Ōsama to Atomu*	The King and Atom	*Oct. 30, 1965* *27.9%*	
141	機関車行進曲 *Kikansha kōshinkyoku*	March of the Locomotives	*Nov. 6, 1965* *30.4%*	
142	ミーニャの星 *Mīnya no hoshi*	The Planet Minya	*Nov. 13, 1965* *31.7%*	
143	バード・ストリート物語 *Bādo Storīto monogatari*	Bird Street Story	*Nov. 20, 1965* *33.8%*	
144	失われた友情 *Ushinawareta yūjō*	A Friendship Lost	*Nov. 27, 1965* *31.3%*	
145	アトム深海を行く *Atomu shinkai wo iku*	Atom in the Deep Sea	*Dec. 4, 1965* *31.7%*	
146	未来からの報告 *Mirai kara no hōkoku*	Report from the Future	*Dec. 11, 1965* *29.2%*	

147	空中スクリーン *Kūchū skurīn*	The Flying Screen	*Dec. 18, 1965* *27.8%*	
148	ロビオとロビエット *Robio to Robietto*	Robio and Robiette	*Dec. 25, 1965* *29.7%*	
149	カンヅメ狂騒曲 *Kanzume kyōsōkyoku*	The Canned Goods Rhapsody	*Jan. 1, 1966* *26.7%*	
150	マグネットちゃん *Magunetto-chan*	Little Miss Magnet	*Jan. 8, 1966* *30.9%*	
151	一人ぼっちのアトム *Hitori-botchi no Atomu*	Atom All Alone	*Jan. 15, 1966* *29.9%*	
152	ロボット爆弾 *Robotto bakudan*	Robot Bombs	*Jan. 22, 1966* *30.2%*	
153	赤い木馬 *Akai mokuba*	The Red Carousel Pony	*Jan. 29, 1966* *29.7%*	
154	青い鳥物語 *Aoitori monogatari*	The Story of Blue Bird	*Feb. 5, 1966* *23.8%*	
155	狂った国境線 *Kurutta kokkyōsen*	The Crazy Border	*Feb. 12, 1966* *24.5%*	
156	ロボット市長 *Robotto shichō*	Robot Mayor	*Feb. 19, 1966* *27.8%*	
157	ジプシーの星 *Jipushī no hoshi*	Gypsy Planet	*Feb. 26, 1966* *28.0%*	
158	おかしな道づれ *Okashina michizure*	An Odd Companion	*Mar. 4, 1966* *25.1%*	
159	悪魔と天使 *Akuma to tenshi*	The Devil and the Angel	*Mar. 19, 1966* *22.7%*	
160	黄金のフルート *Ōgon no furūto*	The Golden Flute	*Mar. 26, 1966* *24.7%*	
161	夢を売る宇宙人 *Yume wo uru uchūjin*	Aliens Selling Dreams	*Apr. 2, 1966* *24.0%*	
162	キャンデー作戦 *Kyandē sakusen*	The Candy Strategy	*Apr. 9, 1966* *26.1%*	
163	別世界への道 *Betsusekai e no michi*	Route to Another Planet	*Apr. 16, 1966* *24.6%*	
164	宇宙の怪物 *Uchū no kaibutsu*	Space Monster	*Apr. 23, 1966* *25.7%*	

165	赤ん坊騒動 *Akanbō sōdō*	The Baby Commotion	*Ap. 30, 1966* *27.2%*	
166	ジュエルの魔像 *Jueru no mazō*	The Strange Jewel Statues	*May 7, 1966* *23.3%*	
167	風船がいっぱい *Fūsen ga ippai*	Too Many Balloons	*May 14, 1966* *25.4%*	
168	おどりあがった島 *Odoriagatta shima*	An Island Takes Off	*May 21. 1966* *25.9%*	
169	未来人の忘れ物 *Miraijin no wasuremono*	What the People of the Future Left Behind	*May 28, 1966* *24.3%*	
170	二人の王女さま *Futari no ōjo sama*	Two Princesses	*June 4, 1966* *27.3%*	
171	永遠のクッチャー *Eien no Kucchā*	Kutcha Forever	*June 11, 1966* *26.5%*	
172	ヘラルド兄弟 *Herarurudo kyōdai*	The Herald Brothers	*June 25, 1966* *19.8%*	
173	ロボッティ *Robottei*	Robotty	*July 2, 1966* *20.9%*	
174	海底大運河 *Kaitei daiunga*	The Undersea Canal	*July 9, 1966* *22.1%*	
175	ロボット大戦争 (1) *Robotto daisensō*	Robot Wars (1)	*July 23, 1966* *22.5%*	
176	ロボット大戦争 (2) *Robotto daisensō*	Robot Wars (2)	*July 30, 1966* *22.9%*	
177	ばかでっかいロボット *Baka dekkai robotto*	A Ridiculously Big Robot	*Aug. 6, 1966* *23.0%*	
178	チータン夜の冒険 *Chītan yoru no bōken*	Titan's Night of Adventure	*Aug. 20, 1966* *22.5%*	
179	青騎士(1) *Aokishi*	Blue Knight (1)	*Aug. 27, 1966* *27.1%*	
180	青騎士(2) *Aokishi*	Blue Knight (2)	*Sep. 3, 1966* *30.7%*	
181	幽霊製造機 (2作目) *Yūrei seizōki*	Ghost Manufacturing Machine (remake of no. 8)	*Sep. 10, 1966* *21.9%*	
182	狂ったコバルト *Kurūtta Kobaruto*	Cobalt Goes Crazy	*Sep. 24, 1966* *24.4%*	

183	宇宙から来たニッポン人 *Uchū kara kita nipponjin*	Japanese from Outer Space	*Oct. 1, 1966* *22.5%*	
184	タイム戦争 *Taimu sensō*	Time Wars	*Oct. 8, 1966* *23.6%*	
185	アフリカの星 *Afurika no hoshi*	The Africa Planet	*Oct. 22, 1966* *27.2%*	
186	オバケは夜来る *Obake wa yoru kuru*	Ghosts Come Out at Night	*Oct. 29, 1966* *26.2%*	
187	ベーリーの冒険 *Bērī no bōken*	Bailey's Adventure	*Nov. 5, 1966* *25.4%*	
188	鞍馬の天狗 *Kurama no tengu*	The Kurama Tengu	*Nov. 19, 1966* *26.2%*	
189	撮影所騒動 *Satsueisho sōdō*	Ruckus at the Film Studio	*Nov. 26, 1966* *22.4%*	
190	メソタミアの奇蹟 *Mesotamia no kiseki*	Miracle of Mesotamia	*Dec. 3, 1966* *31.7%*	
191	さすらいのロッピ *Sasurai no Roppi*	Loppy the Wanderer	*Dec. 17, 1966* *27.8%*	
192	メドッサの館 *Medossa no yakata*	The House of Medossa	*Dec. 24, 1966* *29.7%*	
193	地球最大の冒険 *Chikyū saidai no bōken*	The Greatest Adventure on Earth	*Dec. 31, 1966* *23.0%*	

Notes

To save space, frequently cited works have been identified by the following abbreviations:

MT	Osamu Tezuka, *Tezuka Osamu manga zenshū* (The Complete Works of Osamu Tezuka's Manga), 400 vols. (Tokyo: Kodansha, 1977–97).
SCTA	Osamu Tezuka, *Tetsuwan Atomu* (Mighty Atom), 23 vols., Sunday Comics edition (Tokyo: Akita Shoten, 1999–2000).
DVDTA	*Tetsuwan Atomu Complete BOX*, DVD (Tokyo: Mushi Productions, Tezuka Osamu Animation World, and Columbia Music Entertainment, 2005).
DVDAB	*Astro Boy Ultra Collector's Edition DVD Box Set* (The Right Stuf International, 2006).

Works that can also be found as subsets in Kodansha's *Tezuka Osamu manga zenshū* are indicated by the abbreviation MT and its correlating volume number in parentheses.

1. Editorial, "Tetsuwan Atomu no messēji" (Mighty Atom's Message), *Asahi shimbun*, February10, 1989.
2. Ministry of Economy, Trade, and Industry (Japan); Commerce and Information Policy Bureau; Information Services Industry Division "Kontentsu sangyō no kokusai tenkai to hakyūkōka" (International Development and Spin-off Effect of the Contents Business), April 2003, 22–23, http://www.meti.go.jp/policy/media_contents/downloadfiles/dai1kai(kokusaisenryaku)siryo4.pdf.
3. "Atomu dorīmu purojekutto to wa" (What is the Atom Dream Project?), Tezuka Productions and Atom Dream Project brochure (Tokyo: Tezuka Productions, 2003).
4. "Kurashi ni robotto; Robodex 2003 raigetsu mikka, Yokohama de kaisai" (Robots in Our Lives; Robodex 2003 to Be Held in Yokohama from the Third of Next Month), *Asahi shimbun*, March 25, 2005.
5. "30-Year Robot Project Pitched: Researchers See Tech Windfalls in Costly Humanoid Quest," *Japan Times*, August 20, 2003.

6. Editorial, "Atomu no namida wa mō mitakunai" (We Don't Want to See Any More of Atom's Tears), *Asahi shimbun*, April 3, 2003; and editorial cartoon in *Asahi shimbun*, April 8, 2003.
7. O. Tezuka, SCTA, 3: 213–214.
8. O. Tezuka, *Boku wa mangaka*, 118.
9. O. Tezuka, SCTA, 13:217.
10. O. Tezuka, *Boku wa mangaka*, 119.
11. Takeshi Nagai, quoted in "Eien no hīro, Tetsuwan Atomu: Atomu no tanjō" (Mighty Atom, the Eternal Hero: The Birth of Atom), NHK BS2 channel, April 1, 2002.
12. Ibid.
13. Osamu Tezuka, "Watashi no dokusho henreki" (My Reading Habits), *The High School Life*, April 1, 1968 (MT397:4–5); and "Watakushi no dokushojutsu" (My Reading Techniques), *Asahi shimbun*, September 12, 1969 (MT397:42–43).
14. See O. Tezuka and Kobayashi, *Tezuka Osamu konchū zukan*.
15. E. Tezuka, *Tezuka Osamu no shirarezaru tensai jinsei*, 136–37; O. Tezuka, *Boku wa mangaka*, 36; and Nakano, *Tezuka Osamu no Takarazuka*, 145–154.
16. O. Tezuka, *Boku no manga jinsei*, 62–65.
17. O. Tezuka, *Garasu no chikyū wo sukue*, 49.
18. O. Tezuka, *Tezuka Osamu kōenshū*, 154–157 (MT400); and O. Tezuka and Jun, *Tezuka Osamu manga no okugi*, 138–142 (MT391).
19. Suihō Tagawa, introduction to *Manga shōnen-shi* (A History of *Manga shōnen*), Hiro Tirada, ed. (Tokyo: Shōnan Suppan, 1981), 4–5.
20. "5 Missing Manga Pieces by Osamu Tezuka Found in U.S." *International Herald Tribune/Asahi shimbun*, May 11, 2006; "Maboroshi no Tezuka manga, kōkai" (Missing Tezuka Manga Revealed), in "Nippon no Manga" (The Manga of Japan), *Aera Comic* (Tokyo: Asahi Shimbunsha), November 1, 2006, 200–207.
21. O. Tezuka, SCTA, 16:6–7.
22. Advertisement in *Tokyo shimbun*, February 11, 1964.
23. "Bambi, Pinokio. Maboroshi no Tezuka sakuhin, fukkoku" (Bambi, Pinocchio. Rare Tezuka Works to Be Republished), *Asahi shimbun*, March 17, 2006.
24. O. Tezuka and Jun, *Tezuka Osamu manga no okugi*, 59–68 (MT391).
25. Osamu Tezuka, "*Sūpāman* tokubetsu kanshōki" (Special Notes of Appreciation on *Superman*), in Mori, *Zusetsu Tetsuwan Atomu*, 36–37. Originally published in *Screen*, August 1979.
26. O. Tezuka, SCTA, 2:102–103.

27. O. Tezuka, SCTA, 15:188; and O. Tezuka, SCTA, 9:8.
28. O. Tezuka, SCTA, 9:170; and O. Tezuka, SCTA, 15:7–8.
29. Nakano, *Osamu Tezuka no Takarazuka*, 60.
30. O. Tezuka, *Boku wa mangaka*, 18–19.
31. O. Tezuka, *Mushirareppanashi*, 130; and editorial, "Tetsuwan Atomu no messēji" (Mighty Atom's Message), *Asahi shimbun*, February 10, 1989.
32. Mamie Kawai, "Atomu no haha, Takarazuka kageki?" (Was the Takarazuka Theater the Mother of Atom?), *Asahi shimbun*, April 7, 2003.
33. Minako Tezuka and others, "Shinyū ga kataru Tezuka Osamu no Shōnen jidai; Tezuka no tanjōchi Okamachi kara hasshin" (Osamu Tezuka's Boyhood, as Described by His Close Friends), lecture held at public welfare hall of Toyonaka City, April 5, 2003, transcript, http://www2.ocn.ne.jp/–norimi/kouen.html.
34. O. Tezuka, *Tezuka Osamu Rando 2*, 49–50.
35. From a lecture titled "Anime to watakushi" (Animation and Me) given February 13, 1988, reprinted in *Tezuka Osamu gekijō,* Tezuka Productions, 7–8.
36. O. Tezuka, *Boku wa mangaka*, 28.
37. O. Tezuka, *Boku wa mangaka*, 29.
38. Osamu Tezuka, "Wa ga kokoro no animēshon" (Animation Dear to My Heart), in *Tezuka Osamu zenshi*, ed. Tezuka Productions, 180–81. Originally published in Mushi Productions, *Tetsuwan Atomu kurabu*, July/October/November 1965 editions.
39. See also a paper submitted in English: G. Yasuzumi, M.D., Hiroaki Tanaka, M.D., and Osamu Tezuka M.D., "Spermatogenesis in Animals as Revealed by Electron Microscopy: VIII. Relation between the Nutritive Cells and the Developing Spermatids in a Pond Snail, Cipangopaludina malleata Reeve," *The Journal of Cell Biology* 7 (1960): 499–503.
40. "Staffu intabyū: 'Atomu' shoki enshutsu & genga staffu—Sakamoto Yusakushi" (Staff Interview: Yusaka Sakamoto, Early Direction and Key Animation Drawings), January 9, 2002, interview in DVDTA, Box 2, "Data File," 44–46.
41. Yamamoto, *Mushi Puro no kōbōki*, 76–77; and Tezuka Productions, *Tezuka Osamu gekijō*, 10.
42. Yamamoto, *Mushi Puro no kōbōki*, 92–93.
43. Yusaku Sakamoto, interview by author, Tokyo, March 5, 2000.
44. DVDTA, Box 3, "Data File," 23.
45. Yamamoto, *Mushi Puro no kōbōki*, 105–107.

46. Yamamoto, *Mushi Puro no kōbōki*, 94.
47. DVDTA, Box 1, "Data File," 40–41.
48. O. Tezuka, *Boku wa mangaka*, 194–96.
49. O. Tezuka, *Boku wa mangaka*, 196.
50. O. Tezuka, *Boku wa mangaka*, 200.
51. Fred Ladd, interview by author, November 2006; also Harvey Deneroff, "Fred Ladd: An Interview," *Animation World Magazine* 1, no. 5 (August 1996).
52. Interview with Fred Ladd, in DVDAB, Set 1, "Extras."
53. Fred Ladd, interview by author, March 5, 1993.
54. O. Tezuka, *Boku wa mangaka*, 198–99.
55. Fred Ladd, interview by author, November 2006.
56. Ibid.
57. Mori, *Zusetsu Tetsuwan Atomu*, 88–89; and DVDTA, Box 1, "Data File," 40–41.
58. Fred Ladd, interview by author, November 2006.
59. Yamamoto, *Mushi Puro no kōbōki*, 119–20.
60. Osamu Tezuka, "Atom wo utte" (Selling Atom), *Tezuka Osamu esseishū*, 6:160–62 (MT395).
61. O. Tezuka, SCTA, 2:71.
62. Mori, *Zusetsu Tetsuwan Atomu*, 89.
63. "Astro Boy Top Ranked Syndication Show in New York City," *Variety*, February 5, 1964, 30.
64. Mori, *Zusetsu Tetsuwan Atomu*, 88.
65. The American artist was Harold "Fred" Frederics, today well known for drawing the *Mandrake the Magician* and *Phantom* comic strips.
66. Fred Ladd, interview by author, March 2, 1993.
67. O. Tezuka, et al., *Tezuka Osamu ten*, 312–313.
68. O. Tezuka, *Tezuka Osamu rando*, 99–102.
69. O. Tezuka, *Boku wa mangaka*, 202–204.
70. O. Tezuka, *Boku wa mangaka*, 103–104.
71. Kusakawa, *Atomu no ko-ra kōya wo mezasu: terebi anime 20 nenshi*, 92–93.
72. Shawne Kleckner, interview by author, December 20, 2006.
73. Charles Solomon, "*Astro Boy* in Glorious Black and White," *New York Times*, April 9, 2006.
74. "Emperor's Letter From War End Disclosed," *Japan Times*, April 16, 1986; and O. Tezuka, interview by author, April 16, 1986.
75. O. Tezuka, "Atomu tanjō" (The Birth of Astro Boy), SCTA, 1:6–13.

76. O. Tezuka, SCTA, 1:11; and O. Tezuka, SCTA, 7:22–23.
77. O. Tezuka, "Atomu to watashi" (Atom and Me), in *Tetsuwan Atomu; robotto no kagaku*, 2 (MT389).
78. Junya Yokota, *SF Daijiten* (Dictionary of SF) (Tokyo: Kadokawa Shoten, 1986), 85; and O. Tezuka, interview by author, April 16, 1986.
79. "Tetsuwan Atomu no sekai to robotto gijutsu" (Robot Technology and the World of Mighty Atom), *Journal of the Japan Robotics Society* 4, no. 3 (June 1986):103.
80. Isaac Asimov, *I, Robot* (New York: Ballantine Books, 1983), xx.
81. O. Tezuka, SCTA, 19:17–19.
82. Masaki Sakamoto, *Tanku Tankurō*, reprint (Tokyo: Kodansha, 1976), 216.
83. Mitsuteru Yokoyama and Fujio Ishihara, "Tetsujin 28 gō wo kaitai suru!" (Dismantling Iron Man No. 28!) *Robotopia* 1 (July 20, 1982): 4–5.
84. Schodt, *Inside the Robot Kingdom*, 82–83.
85. Fukuda, *Tetsuwan Atomu no robotto gaku*, 34.
86. O. Tezuka, interview by author, April 16, 1986.
87. School of Computer Science at Carnegie Mellon University, "About the Robot Hall of Fame," Robot Hall of Fame, http://www.robothalloffame.org/about.html.
88. "Nisoku hokō robotto kenkyū no genjō" (Status of Research on Bipedal Robots), *Journal of the Robotics Society of Japan* 1, no. 3 (October 1983): 45; "Tetsuwan Atomu no sekai to robotto gijutsu" (The World of Mighty Atom and Robot Technology), *Journal of the Japan Robotics Society* 4, no. 3 (June 1986):103; see also "Morph3," 2002 Kitano Symbiotic Systems Project, http://www.symbio.jst.go.jp/–morph/.
89. Nakano, *Atomu no ashi ato*, 42–44.
90. O. Tezuka, "Sangyōyō robotto to Tetsuwan Atomu" (Industrial Robots and Mighty Atom), in *Tezuka Osamu esseishū*, 4:30–34 (MT392). Originally published in *Gekkan robotto enjiniaringu*, September 1982.
91. O. Tezuka, "Watashi no jinsei gekijō" (The Theater of My Life), in *Tezuka Osamu zenshi*, ed. Tezuka Productions, 84–85.
92. O. Tezuka, SCTA, 19:5–165.
93. O. Tezuka, SCTA, 19:5–9.
94. O. Tezuka, "Sōzōryoku no bōken" (Adventures of the Imagination), in *Tezuka Osamu esseishū*, 3:218 (MT389). Originally published in *Rironsha*, December 1981.

95. O. Tezuka, SCTA, 7:148–49.
96. O. Tezuka, SCTA, 21:141–86.
97. Schodt, *Dreamland Japan*, 63–68.
98. O. Tezuka, SCTA, 18:156–57.
99. O. Tezuka, SCTA, 18:182.
100. O. Tezuka, SCTA, 18:162.
101. Osamu Tezuka, "Mitsu me…ni ningen no nimensei wo arawasu" (Three Eyes . . . Showing the Dual Nature of Humans), *Mainichi chūgakusei shimbun*, July 7, 1985.
102. "Manga to hōshanō" (Manga and Radioactivity), *Comic Box* 69 (January 1, 1990): 21–76.
103. Osamu Tezuka, "Betonamu funsō kō miru—Nihon no rekishi ni mo oten" (How I See the Vietnam Conflict: A Blot on Japanese History), April 24, 1965 (from Tezuka Productions files; unsourced newspaper clipping).
104. "Kokoro yasashi Atomu kyō tanjōbi" (Today Is the Birthday of the Gentle Atom), *Akahata*, April 7, 2007, http://www.jcp.or.jp/akahata/aik2/2003-04-07/15_01.html.
105. Osamu Tezuka, from one page of an untitled *Shūkan bunshun* article found in the Tezuka Productions archives, listed in pencil as December 14, 1965.
106. Osamu Tezuka, "Miraijin e no messēji" (Message to People in the Future), in *Tezuka Osamu kōenshū*, 218 (MT389).
107. Schodt, *Manga! Manga! The World of Japanese Comics*, 126–27.
108. Schodt, *Manga! Manga!* 120–137; and Schodt, *Dreamland Japan*, 19–21, 53–59.
109. O. Tezuka, SCTA, 22:7.
110. Osamu Tezuka, "Tenkō mangaka" (Turncoat Manga Artists), in *Tezuka Osamu esseishū*, 3:185–86 (MT389). Originally published in *Shūkan Asahi* (January 1 and 8, 1981).
111. Osamu Tezuka, *Phoenix*, vol. 11 (San Francisco: Viz Media, forthcoming).
112. Osamu Tezuka, interview by Tarō Hara, December 5, 1987, in O. Tezuka, *Tezuka Osamu totteoki no hanashi*, 142.
113. Tezuka Productions and Atom wo Aisuru Kai, *Tetsuwan Atomu: sono yume to bōken*, 77–78.
114. Tomoharu Itani, "Aru Tetsuwan Atomu shiron: robotto no bigaku ni tsuite" (An Attempt at an Atom Theory: On the Aesthetics of Robots), in *Manga hihyō taikei, (1) Atomu, Kagemaru, Sazae-san*, 108.

115. Osamu Tezuka, "Atomu no shi," (The Death of Atom) in O. Tezuka, *Tezuka Osamu esseishū, 5:* 166–69 *(*MT395). Originally published in *Chūō Kōron*, April 1967.
116. Tomino, *Dakara boku wa . . .* , 81–83.
117. O. Tezuka, *Boku wa mangaka*, 192.
118. O. Tezuka, *Boku wa mangaka*, 193.
119. O. Tezuka, *Tezuka Osamu Rando 2*, 51.
120. Shibutani and Oshii, "Naze Tezuka Osamu wa Atomu ga kirai datta no ka," 46.
121. "Tezuka Osamu ni 'kami no te' wo mita toki, boku wa kare to ketsubetsu shita" (I Parted Ways with Osamu Tezuka When I Saw the Hand of God in Him), *Comic Box*, May 1, 1989, 108–109.
122. Tezuka Productions, "Astoro Boy," *Tetsuwan Atomu shinseiki bokkusu*, 3–20.
123. Tezuka Productions, *Tetsuwan Atomu shinseiki bokkusu*, 16.
124. Patten, *Watching Anime, Reading Manga: 25 Years of Essays and Reviews*, 336.
125. Osamu Tezuka, "Gensakusha Tezuka Osamu ōi ni kataru" (Osamu Tezuka, the Creator, Speaks His Mind), in Mori, *Zusetsu Tetsuwan Atomu*, 129–31. Originally published in *My Anime*, February 1982.
126. "Tezuka sensei, shimijimi to kataru; boku no tōbyōki" (Dr. Tezuka Speaks Frankly: My Struggle to Recover), *Tezuka Osamu fan kurabu* 75, no. 10 (September 1988): 2–6.
127. Osamu Tezuka, "Omoide ōi no Atomu" (My Many Memories of Atom), contained in a pamphlet for the October 1, 1988 Atom Bunka Forum, reprinted in *The Animation Filmography of Osamu Tezuka*, 20; and "Atomu bunka fōramu" (Atom Culture Forum), *Tezuka Osamu fan kurabu* 77, no. 10 (December 1988): 2–4.
128. "Tezuka sensei intābyū: '89 nen ni mukete'" (An Interview with Dr. Tezuka about 1989), *Tezuka Osamu fan kurabu* 78 (December 30, 1988): 2–6.
129. E. Tezuka, *Tezuka Osamu no shirarezaru tensai jinsei*, 264.
130. Mori, *Zusetsu Tetsuwan Atomu*, 136–37.
131. Kuzumi, and Uranippon Robboto Bungaku Kankyūjo, *Tezuka Osamu no daiyogen*, 13.

Bibliography

The main source I have used in discussing Tezuka's *Mighty Atom* manga series is the twenty-three-volume Akita Shoten Sunday Comics edition of *Tetsuwan Atomu*, published between 1999 and 2000. It, in turn, is based on the 1975–76 Asahi Sonorama Sun Comics edition. The same Akita Shoten Sunday Comics series is also the basis for the twenty-three-volume Dark Horse Comics English-language edition of *Astro Boy*, published from 2002 to 2004. (Readers of the English-language edition will find that volume numbers correspond exactly with the Japanese edition and page numbers are also almost the same.) For the 1963 Japanese animation series, I have referred mainly to the Japanese *Tetsuwan Atomu Complete BOX 1 & 2*, issued by Mushi Productions, Tezuka Osamu Animation World, and Columbia Music Entertainment in 2005, and also to the English-language 1963 *Astro Boy Ultra Collector's Edition DVD Box Set 1 & 2*, issued in North America by The Right Stuf International. The newer 1980 and 2003 *Astro Boy* animated TV series are today also available in English on DVD from the same American company.

Tezuka was staggeringly productive in his lifetime, and most of his manga, including his *Mighty Atom* series, are published in Japanese in Kodansha's huge four-hundred-volume *Tezuka Osamu zenshū* (The Complete Works of Osamu Tezuka). The last eighteen volumes in this set collect many of Tezuka's writings, lectures, and interviews, and are particularly valuable for researchers. As of 2007, relatively few of Tezuka's manga are translated and available in English, but this will slowly change. Works published in English thus far include:

Tsumi to batsu (*Crime and Punishment*). Tokyo: Japan Times, 1990.

Adorufu (*Adolf*). 5 vols. San Francisco: Viz Media, 1996–97.

Buraku jakku (*Black Jack*). 2 vols. San Francisco: Viz Media, 1999.

Metoroporisu/Daitokai (*Metropolis*). Milwaukee: Dark Horse Comics, 2003.

Kurubeki sekai (*Nextworld*). 2 vols. Milwaukee: Dark Horse Comics, 2003.

Rosuto wārudo (*Lost World*). Milwaukee: Dark Horse Comics, 2003.

Tetsuwan Atomu (*Astro Boy*). 23 vols. Milwaukee: Dark Horse Comics, 2002–4.

Hi no tori (*Phoenix*). 12 vols. San Francisco: Viz Media, 2004–7.

Buddā (*Buddha*). 7 vols., more forthcoming. New York: Vertical, 2003–.
Kirihito sanka (*Ode to Kirihito*). New York: Vertical, 2007.
Aporo no uta (*Apollo's Song*). New York: Vertical, 2007.
MŪ (*MW*). New York: Vertical, 2007.

Many of Tezuka's animated TV series, as well as his theatrical features and experimental films, are also becoming available in DVD format in English and sold on the World Wide Web. For the artistically inclined, there is even a Tezuka Productions–licensed paperback, in English, on how to draw Mighty Atom: *Let's Draw Manga: Astro Boy* (Carson, California: Digital Manga Publishing, 2003).

Other works particularly helpful in writing this book include the *Tezuka Osamu Fan Club* magazine, the informational booklets included in the DVD set, *Tetsuwan Atomu Complete BOX 1 & 2*, and also the now-defunct magazine, *Comic Box*.

Web sites tend to be rather ephemeral, but some that I found very useful in writing this book include:

Tezuka Productions Web site
http://ja-f.tezuka.co.jp/

Tezuka Osamu no subete (Everything about Osamu Tezuka)
http://www.phoenix.to/

Asahi.com's "Astro Boy/Tetsuwan Atom" Web site
http://www.asahi.com/ad/clients/atom/index.html

❍ ❍ ❍

Art of Osamu Tezuka, The. Tokyo: Tezuka Productions, 1994. Informational pamphlet.
Astro Boy Ultra Collector's Edition DVD Box Set. The Right Stuf International, 2006.
Ban, Toshio, and Tezuka Productions. *Tezuka Osamu monogatari* (A Story of Osamu Tezuka). 2 vols. Tokyo: Asahi Shimbunsha, 1992.
Brophy, Philip, ed. *Tezuka: The Marvel of Manga*. Melbourne, Victoria: National Gallery of Victoria, 2006.
Clements, Jonathan, and Helen McCarthy. *The Anime Encyclopedia: A Guide to Japanese Animation since 1917*. 2nd ed. Berkeley: Stone Bridge Press, 2006.
Deneroff, Harvey. "Fred Ladd: An Interview." *Animation World Magazine* 1, no. 5 (August 1996).

Endo, Ushio. *Shōwa robotto mangakan* (The Shōwa Period Robot Manga Hall). Tokyo: Adopointo, 2005.

Fujio (A), Fujiko. *Manga michi* (The Way of Manga). Vols. 1–2. Tokyo: Chūō Kōron Sha, 1986.

Fukuda, Toshio, ed. *Tetsuwan Atomu no robotto gaku* (The Robotics of Mighty Atom). Tokyo: Shūeisha, 2003.

Fuse, Hideto. *Tetsuwan Atomu wa denki hitsuji no yume wo miruka* (Does Mighty Atom Dream of Electric Sheep?) Tokyo: Shōbunsha, 2003.

Gravett, Paul. *Manga: 60 Years of Japanese Comics*. New York: Collins Design, 2004.

Hirata, Shōgō, Keisuke Nemoto, and Aizu Manga Kenkyūkai. *Nihon no reonarudo da vinchi: Tezuka Osamu to rokunin* (The Leonardo da Vincis of Japan: Osamu Tezuka and Six People). Tokyo: Boutique-sha, 2005.

Hornyak, Timothy N. *Loving the Machine: The Art and Science of Japanese Robots.* Tokyo: Kodansha International, 2006.

Ikeda, Hiroaki. *Tetsuwan Atomu VS Tetsujin 28 gō: bokutachi no shōnen jidai* (Mighty Atom vs. Ironman No. 28: When We Were Boys). Tokyo: Wave, 1993.

Ishigami, Mitsutoshi. *Tezuka Osamu no kimyō na sekai* (The Strange World of Osamu Tezuka). Tokyo: Kisōtengai-sha, 1977.

Ishizu, Arashi. *Himitsu no Tezuka Osamu* (The Secret Osamu Tezuka). Tokyo: Taiyō Kikakusha, 1980.

———. *Mushi Puro no samuraitachi* (Mushi Productions' Samurai). Tokyo: Futabasha, 1980.

Izawa, Yutaka, ed. *Atomu no Omocha* (Atom Toys). Tokyo: Dōbunsha, 1994.

———. *Tezuka Osamu no jidai* (The Age of Osamu Tezuka). Tokyo: Tairiku Shobō, 1989.

Kelts, Roland. *Japanamerica: How Japanese Pop Culture Has Invaded the U.S.* New York: Palgrave Macmillan, 2006.

Kobe Shimbun Hanshin Sōkyoku, ed. *Atomu no seiki hajimaru: Tezuka Osamu no nokoshita messēji* (Atom's Century Begins: Messages that Osamu Tezuka Left Us). Kobe: Kobe Shimbunsha, 2003.

Kure, Tomofusa. *Gendai manga no zentaizō: Das gesamtbild vom modernen manga* (An Overview of Modern Manga). Tokyo: Futabasha, 1997.

Kusakawa, Akira. *Atomu no ko-ra kōya wo mezasu: terebi anime 20 nenshi* (Atom's Children Aim for the Frontier: Twenty Years of TV Animation). Tokyo: Rippū Shobō, 1981.

Kusamori, Shinnichi, and Inuhiko Yomota. *Atomu to Tora-san: sōdai na yume no shōtai* (Atom and Tora-san: The Truth about a Dream on a Vast Scale). Tokyo: Kawade Shobō Shinsha, 2005.

Kuzumi, Tatsurō, and Uranippon Robotto Bungaku Kenkyūjo. *Tezuka Osamu no daiyogen* (Osamu Tezuka's Grand Prophesies). Tokyo: Heibonsha, 2003.

Mori, Haruji. *Zusetsu Tetsuwan Atomu* (Mighty Atom Illustrated). Tokyo: Kawade Shuppan, 2003.

Mushi Purodakushon shiryōshū 1962–73 (Mushi Productions' Data File, 1962–73). Tokyo: Mushi purodakushon shiryōshū henshūshitsu, 1977.

Nakamura, Takafusa. *Economic Development of Modern Japan*. Tokyo: International Society for Educational Reform, Inc., 1985.

Nakano, Eiji. *Atomu no ashi ato* (The Footsteps of Mighty Atom). Tokyo: Suken Shuppansha, 2003.

Nakano, Haruyuki. *Tezuka Osamu no Takarazuka* (Osamu Tezuka's Takarazuka). Tokyo: Chikuma Shobō, 1994.

Natsume, Fusanosuke. *Tezuka Osamu no bōken: sengo manga no kamigami* (Osamu Tezuka's Adventure: The Gods of Postwar Manga). Tokyo: Shōgakkan, 1998.

———. *Tezuka Osamu wa doko ni iru* (Where is Osamu Tezuka?) Tokyo: Chikuma Shobō, 1992.

Nikaidō, Reito. *Bokura ga aishita Tezuka Osamu* (The Osamu Tezuka We Loved). Tokyo: Shōgakkan, 2006.

Noguchi, Fumio. *Tezuka Osamu no kimyō na shiryō* (Osamu Tezuka's Strange Materials). Tokyo: Jitsugyō no Nihonsha, 2002.

Oki, Kōsei. *Tetsuwan Atomu daijiten* (The Unabridged *Mighty Atom* Dictionary). Tokyo: Shōbunsha, 1996.

———. *Tetsuwan Atomu kaitai shinsho* (A New Deconstruction of Mighty Atom). Tokyo: Kōsaidō Shuppan, 2003.

Ono, Kōsei. *Tezuka Osamu: manga no uchū e tabidatsu* (Osamu Tezuka: On a Journey to the Manga Universe). Tokyo: Bronze Shinsha, 1989.

Onoda, Natsu. "Tezuka Osamu: An Intertextual History of Comics in Post–World War II Japan." PhD diss., Northwestern University, 2005.

Ōshiro, Noboru, Osamu Tezuka, and Leiji Matsumoto. *OH! Manga*. Tokyo: Shōbunsha, 1992.

Ōtsuka, Eiji. *Atomu no meidai: Tezuka Osamu to sengo manga no shudai* (An Atom Thesis: Osamu Tezuka and Themes in Postwar Manga). Tokyo: Tokuma Shoten, 2003.

Patten, Fred. *Watching Anime, Reading Manga: 25 Years of Essays and Reviews*. Berkeley: Stone Bridge Press, 2004.

Poitras, Gilles. *Anime Essentials: Every Thing a Fan Needs to Know*. Berkeley: Stone Bridge Press, 2001.

Randall, Bill. "Osamu Tezuka: Behold Japan's 'God of Manga.'" Special issue, *The Comics Journal* 5 (2005): 46–57.

Saitani, Ryo, ed. *Aru hi no Tezuka Osamu: 56nin ga kakikataru totteoki no ano hi* (A Day with Osamu Tezuka: 56 People Write and Talk about a Special Day). *Bessatsu Comic Box* 4, no. 9 (February 1999).

Sakurai, Tetsuo. *Tezuka Osamu: jidai to kirimusubu hyōgensha* (Osamu Tezuka: The Creator Who Crossed Swords with His Times). Tokyo: Kodansha, 1990.

Schodt, Frederik L. *America and the Four Japans: Friend, Foe, Model, Mirror*. Berkeley: Stone Bridge Press, 1994.

———. *Dreamland Japan: Writings on Modern Manga*. Berkeley: Stone Bridge Press, 1996.

———. *Inside the Robot Kingdom: Japan, Mechatronics, and the Coming Robotopia*. Tokyo: Kodansha International, 1988.

———. *Manga! Manga! The World of Japanese Comics*. Tokyo: Kodansha International, 1983.

Sekikawa, Natsuo. *Chishikiteki taishū shokun, kore mo manga da: manga o nikumu hito no tame no manga annai* (O, Intelligent Masses, These Too Are Manga: A Guide to Manga for Those Who Hate Them). Tokyo: Bungei Shunjū, 1991.

Shibutani, Yōichi, and Oshii, Mamoru. *Naze Tezuka Osamu wa Atomu ga kirai datta no ka* (Why Did Osamu Tezuka Hate *Mighty Atom?*) *Sight (Rockin' on Japan* expanded edition) (April 19, 2003): 12–87.

Shimotsuki, Takanaka, ed. *Tanjō! "Tezuka Osamu"—Manga no kamisama wo sodateta bakkuguraundo.* (The Birth of Osamu Tezuka! The Background That Fostered the God of Manga). Tokyo: Asahi Sonorama, 1998.

Sōtokushū Tezuka Osamu (Special Edition on Osamu Tezuka). *Bungei bessatsu*. Tokyo: Kawade Shobō Shinsha, 1999.

Takeda, Tōru. *Kakuron: Tetsuwan Atomu to genpatsu jiko no aida* ('Nuclear' Theories: Between Mighty Atom and Atomic Power Plant Accidents). Tokyo: Keisō Shobō, 2002.

Takeuchi, Osamu, and Tomohiko Murakami. *Manga hihyō taikei (1) Atomu, Kagemaru, Sazae-san* (A Compendium of Manga Criticism. Vol. 1, Atom, Kagemaru, Sazae-san). Tokyo: Heibonsha, 1989.

Tanaka, Michio. *Atomu wa boku ga koroshimashita: Tezuka Osamu no kokoro* (I Killed Atom: The Mind of Osamu Tezuka). Tokyo: Sunmark Shuppan, 2002.

Tezuka, Etsuko. *Tezuka Osamu no shirarezaru tensai jinsei* (Osamu Tezuka, the Unknown Life of a Genius). Tokyo: Kodansha, Purasu Arufa Bunko, 1999.

Tezuka, Macoto. *Tensai no musuko: Berē wo totta Tezuka Osamu* (Son of a Genius: Osamu Tezuka without the Beret). Tokyo: Sony Magazines, 2003.

Tetsuwan Atomu Complete BOX. DVD. Tokyo: Mushi Productions, Tezuka Osamu Animation World, and Columbia Music Entertainment, 2005.

Tezuka, Osamu. *Astro Boy*. 23 vols. Milwaukee: Dark Horse Comics, 2002–4.

———. *Atomu to watashi: robotto no kagaku* (Atom and I: The Science of Robots), in *Tetsuwan Atomu: robotto no kagaku* (Mighty Atom: The Science of Robots). Kōbunsha Kappa Komikkusu, September 15, 1965.

———. *Boku no manga jinsei* (My Manga Life). Tokyo: Iwanami Shinsho, 1997.

———. *Boku wa mangaka—Tezuka Osamu jiden 1* (I Am a Manga Artist: The Autobiography of Osamu Tezuka. Vol. 1). Tokyo: Yamato Shobō, 1979.

———. *Garasu no chikyū wo sukue: 21 seiki no kimitaichi e* (Save Mother Earth: To the Youth of the Twenty-First Century). Tokyo: Kōbunsha Bunkō, 1996.

———. *Manga no kakikata* (How to Draw Manga). Tokyo: Kōbunsha Bunkō , 1977.

———. *Manga senka: shokyūhen* (A Course in Manga: For Beginners). Tokyo: Mushi Productions, 1969.

———. *Mitari, tottari, utsushitari* (Watching, Shooting, and Screening). Tokyo: Kinema Junpō-sha, 1987.

———. *Mushirareppanashi* (Well-Digested Talks). Tokyo: Ushio Shuppan, 1981.

———. *Tetsuwan Atomu* (Mighty Atom). 23 vols. Sunday Comics edition. Tokyo: Akita Shoten, 1999–2000.

———. *Tetsuwan Atomu daizukan* (All Illustrations of Mighty Atom). Tokyo: Kodansha, 1993.

———. *Tezuka Osamu e-konte daizen* (Complete Collection of Osamu Tezuka's Story Boards). Tokyo: Kawade Shobō Shinsha, 1999.

———. *Tezuka Osamu esseishū* (A Collection of Osamu Tezuka's Essays). 8 vols. Tokyo: Kodansha, 1996–97.

———. *Tezuka Osamu kōenshū* (A Collection of Osamu Tezuka's Lectures). Tokyo: Kodansha, 1997.

———. *Tezuka Osamu manga zenshū* (The Complete Works of Osamu Tezuka's Manga). 400 vols. Tokyo: Kodansha, 1977–97.

———. *Tezuka Osamu Rando* (Osamu Tezuka Land). Tokyo: Yamato Shobō, 1977.
———. *Tezuka Osamu Rando 2* (Osamu Tezuka Land 2). Tokyo: Yamato Shobō, 1978.
———. *Tezuka Osamu taidanshū* (A Collection of Osamu Tezuka's Essays). 4 vols. Tokyo: Kodansha, 1996–97.
———. *Tezuka Osamu totteoki no hanashi* (Osamu Tezuka's Best Talks). Tokyo: Shin Nippon Shuppansha, 1990.
———. *Yūrei otoko/Shōri no hi made* (Ghost Man/Until the Day of Victory). Tokyo: Asahi Shimbunsha, 1995.
Tezuka, Osamu, Yoshikazu Iwasaki, and The National Museum of Modern Art, Tokyo. *Tezuka Osamu ten* (The Osamu Tezuka Exhibit). Tokyo: The National Museum of Modern Art, 1990.
Tezuka, Osamu, and Ishiko Jun. *Tezuka Osamu manga no okugi* (The Secrets of Osamu Tezuka's Manga). Tokyo: Kodansha, 1992.
Tezuka, Osamu, and Junji Kobayashi. *Tezuka Osamu konchū zukan* (Field Guide to Osamu Tezuka's Insects). Tokyo: Kodansha, 1997.
Tezuka, Osamu, and M. Nitta. *Tezuka Osamu manga 40 nen* (Osamu Tezuka Cartoons of 40 Years). Tokyo: Akita Shoten, 1984.
Tezuka Productions, and Atom wo Aisuru Kai, eds. *Tetsuwan Atomu: sono yume to bōken* (Mighty Atom: The Dream and the Adventure). Tokyo: JTB, 2003.
Tezuka Productions, and Keishō Ikeda. *Tezuka Osamu kyarakutā zukan dai 1 kan* (An Illustrated Encyclopedia of Osamu Tezuka Characters. Vol. 1). Tokyo: Asahi Shimbunsha, 1998.
Tezuka Productions, ed. "Astoro Boy" (Astro Boy), in *Tetsuwan Atomu shinseiki bokkusu* (Mighty Atom New Century Box). Tokyo: Hiro Communications, 1992.
Tezuka Productions, ed. *Tezuka Osamu gekijō* (The Animation Filmography of Osamu Tezuka). Tokyo: Tezuka Productions, 1991.
Tezuka Productions, ed. *Tezuka Osamu genga no himitsu* (Secrets of Osamu Tezuka's Original Drawings). Tokyo: Shinchōsha, 2006.
Tezuka Productions, ed. *Tezuka Osamu zenshi: sono sugao to gyōseki* (A Complete History of Osamu Tezuka: The Real Man, and His Accomplishments). Tokyo: Akita Shoten and Tezuka Productions, 1998.
Tezukanian Hakubutsukan. *Sengo Nippon no taishū bunka ni okeru kyojin: Tezuka Osamu no shinjitsu to nazo to himitu to rirekisho* (The Giant of Postwar Japanese Popular Culture: The Truth, Mysteries, Secrets, and Personal History of Osamu Tezuka). Tokyo: Sangasha, 1993.
Tomino, Yoshiyuki. *Dakara boku wa . . .* (That's Why I Am . . .) Rev. ed. Tokyo: Tokuma Shoten, Animage Bunko, 1983.

Tokyo Seikatsu Kenkyūjo, ed. *Gendai kagaku wa Atomu ni oitsuitaka?! Genjitsu! Higenjitsu? Tezuka Osamu no zunō ni semaru!* (Has Modern Science Caught Up with Atom?! Realistic! Unrealistic? Analyzing Osamu Tezuka's Brain!) Tokyo: Media Factory, 1999.

Watabiki, Katsumi, and Osamu Tezuka. *Tetsuwan Atomu: robotto saiensu* (The Robot Science in Mighty Atom). Tokyo: Shōgakkan, 1994.

Yamamoto, Eiichirō. *Mushi Puro no kōbōki* (The Rise and Fall of Mushi Productions). Tokyo: Shinchōsha, 1989.

Yonezawa, Yoshihiro, ed. *Tezuka Osamu manga daizen* (The Complete Work on Osamu Tezuka Manga). Bessatsu Taiyō series. Tokyo: Heibonsha, 1997.

Index

2001: A Space Odyssey, 92
Adolf (*Adorufu*), 155
Africans and African Americans, 125–27
AIBO robots, 8
Akahata newspaper, 134
akahon (red book) manga, 18, 22–23
"*Akai neko.*" See "Red Cat"
Akatsuka, Fujio, 49, 74
Alakazam the Great (*Saiyūki*), 62–63, 79
Ambassador Atom (*Atomu Taishi*), xviii, 16–20, 104, 177,185
androids, 8, 12, 51, 110–11, 168
"Angel of Vietnam" ("*Betonamu no tenshi*"), 43, 133, 135, 183
animation production, 63–75, 81–87
anime, origin of word, 62
anti-Disney, 64
antinuclear movement, 81, 144
antiwar sentiment, 64, 135, 140, 144
"*Aokishi.*" See "Blue Knight"
Apollo program, 10–11
April 7, 2003, 5, 7, 13, 15, 102, 134
Arare-chan (*Dr. Slump*), 111, 162
Arita family, 126–27
artificial intelligence (A.I.), 99, 105, 110, 114, 116, 118
Aru machikado no uta. See *Story of a Certain Street Corner*
Asahi shimbun (newspaper), vii, xiv, 7, 8, 15, 51, 172
Asahi, Tarō, 24
Ashida, Iwao, 59
Asimo, 11–12, 116
Asimov, Isaac, 107–8
Association to Stop Racism Against Blacks, 126
Astro Boy/Tetsuwan Atomu, xiv, 4, 96, 169
Astro Boy U.S. TV series: creation of, 76–97; naming of, 80–81; popularity of, 87–90; problems with, 83–84; theme song, 81
Astro Girl (Uran), 39–40, 179, 181, 187
Atlas, xxi, 127–30, 158, 162, 178, 181, 186
atom bombs, 19, 99, 130, 133
Atom Cat, 163
Atom Dream Project, 6–7, 13
Atom Project, 10
"Atom Reborn" ("*Atomu fukkatsu*"), x, 180
Atomu Taishi. See *Ambassador Atom*
"*Atomu tanjō.*" *See* "Birth of Atom, The"
ATR institute, 10

Bambi, 44, 59
Ban, Shunsaku. *See* Mustachio
Batman, 22
Beethoven, 69, 166
"*Beirī no sangeki.*" *See* "Tragedy of Bailey, The"
"*Betonamu no tenshi.*" *See* "Angel of Vietnam, The"
Betty Boop, 44
"Birth of Atom, The" ("*Atomu tanjō*"), 185
Black Jack, 155, 173, 204
"Blue Knight" ("*Aokishi*"), 121–23, 130, 145–47, 149, 180, 195
Bōken Dankichi (Dankichi the Adventurer), 24
Boku no Songokū! (My Songoku!), 62
bombings, of Japanese cities, 19, 22, 29, 59
Boone Marukubi, 53
Boynton, Aster II. *See* Tènma, Dr.
Boynton, Aster III. *See* Tènma, Tobio
Breen, Bill, 81
Bringing Up Father ("Jiggs and Maggie"), 27, 44
Buddha, 141, 162
Buddhism, 47, 86, 106, 141, 148
burakumin, 47, 123
Bush, George, 15

Cactus Kid. See *Saboten-kun*
Campaign to Banish Bad Reading Matter, 137
Čapek, Karel, 106
censorship, 31–33, 137
"*Chikyū saidai no bōken.*" *See* "Greatest Adventure on Earth, The"
Chikyū tonneru (Earth Tunnel), 22
China and Chinese, 26, 28, 32, 50, 107, 134, 159, 165
Christianity, 86, 106, 139, 141
Cobalt, 39–40, 177, 190, 195
Cold War, 81, 120
comic books (American), 22, 45–46, 137
Comics Code Authority, 137
continuity sketches, 69
Crime and Punishment (*Tsumi to batsu*), xii, 25, 50–51, 204
Crown Prince of Japan, 55, 61, 98
"Crucifix Island" ("*Jūjikajima*"), xvi, 178, 186
cultural differences, 83–87
cyborgs, 163

da Vinci, Leonardo, viii
Dad (Atom's father), 38, 40, 48, 125
Dadakai, x
Dalton, James, 101
Dankichi the Adventurer. See *Bōken Dankichi*
Dark Horse, xii, xv, 122, 125, 127, 130, 135, 143, 146, 177
Dentsu, 6
discrimination, 121–26, 160, 174
Disney, Walt, 90–93, 95, 127, 139, 150, 152–55, 169, 174
Disneyland and Disney World, 49, 91, 174
Doi, Toshitada, 8

"Dolphin Civilization" ("*Iruka bunmei*"), 70, 190
Doraemon, 111
Dororo, 173
Dostoevsky, Fyodor, xii, 25, 50
Dr. Slump. *See* Arare-chan
Dreamland Japan, xii

ecology, 143–44, 158, 160
"Electro," 49, 130, 178, 185
Electro-brain, 101, 104
Elefun, Packadermus J. *See* Professor Ochanomizu
Emperor of Japan, vii, 29, 30–31, 55, 98, 132–33
"End of Atom, The" ("*Atomu no saigo*"), 139, 148, 184
Esperanto, 30
"Eyes of Christ, The" ("*Kirisuto no me*"), 85, 141, 179, 186

"Faceless Robot, The" ("*Kao no nai robotto*"), xv, 180
fan clubs, 34, 165, 205
Fantastic Voyage, 92–93
Faust, 166
Felix the Cat, 57
Ferson, Todd, 96
Fleischer, Max, 44, 57–58, 127
Flintstones, 67, 70
"Franken" ("*Furanken*"), 70, 124, 181, 185
Frankenstein, 10, 106, 111, 177
"Führer ZZZ" ("*ZZZ Sōtō*"), xii, 178, 187
Fuji TV, ix, 61, 67–68, 75, 82, 94
Fujio, Fujiko F., 49, 74
Fujio (A), Fujiko, 49, 74
Fuku-chan (Little Fuku), 27
full animation (see also "limited animation"), 63, 66, 72, 152, 154
Furuta, Takayuki, xv, 117
Fushigi na kuni no Putchā. See *Putchā in Wonderland*
Future Robotics Organization (fuRo), 117

Galaxy Express 999, 73
gekiga (action pictures), 48, 60–61, 136, 139
Gigantor. See *Tetsujin 28 gō*
"God of Manga," 16, 126
golems, 106, 109
Goossens, Ray, 80
Gordon W. Prange Collection, 32
"Greatest Adventure on Earth, The" ("*Chikyū saidai no bōken*"), 71, 147, 196
"Greatest Robot on Earth, The" ("*Shijō saidai no robotto*"), xi, 171, 180, 192
Gumshoe, Detective Inspector. *See* Tawashi
Gundam, 8, 73, 112, 151, 162

Hamegg, 41, 52
Hanna-Barbera, 67
Higeoyaji. *See* Mustachio
Hi no tori. See *Phoenix*
Hiroshima, 19
Hitachi, 117
Hollywood, 14, 43, 52, 137, 168
Honda, 9, 11–12, 116
Hosoda, Yūji, 117
"Hot Dog Corps, The" ("*Hotto doggu heidan*"), xiv, 179, 187
Huckleberry Hound, 67
humanism, 131–32
humanoid robots, 9, 11, 98, 101, 112, 116–18, 145, 173, 190
Hussein, Saddam, 15, 174
hydrogen bombs, 17
Hyōtantsugi, 53, 85

Inside the Robot Kingdom, xii
Iron Man No. 28. See *Tetsujin 28 gō*
"*Iruka bunmei*." See "Dolphin Civilization"
Ishiguro, Noboru, 160
Ishinomori, Shōtaro, 49, 74
Itani, Tomoharu, 149
"Ivan the Fool" ("*Iwan no baka*"), 42, 179, 185

Janguru Taitei. See *Jungle Emperor*
Japan Communist Party (JCP), 134–35
Japan Robot Association (JARA), 8
Japanese Americans, 124
Jetsons, The, 70
Jetter Mars, 159
Jetto. *See* Cobalt
"Jiggs and Maggie." See *Bringing Up Father*
jinzō ningen (artificial humans), 108–9
"*Jūjikajima*." *See* "Crucifix Island"
Jungle Emperor, 22, 73, 89, 94, 126, 155

Kami no toride (Paper Fortress), 28
Kamidaka Boys' Choir, 182
kami-shibai (paper plays), 61, 66
Kanai, Takeshi, 20–23, 30
Kaneda, Shōtarō, 110
Kansai area of Japan, 18
"*Kao no nai robotto*." *See* "Faceless Robot, The"
Kappa Comics, 43, 114, 116
Kasei tanken. See *Voyage to Mars* and "Mission to Mars"
Katō, Ken'ichi, 31
Katō, Ryōzō, 116
Kawato, Mitsuo, 10
Ken'ichi (Ken'ichi Shikishima), 39–40
Kewpie dolls, 45
key animators, 64
"*Kiiroi Uma*." *See* "Yellow Horse"
Kim Sankaku, 52
Kimba the White Lion. See *Jungle Emperor*
Kleckner, Shawne, xv, 96
Kōbunsha, 16, 18, 38
Kubrick, Stanley, 92
Kunikida, Doppo, 142
Kuzumi, Tatsurō, 173–74

Ladd, Fred, xv, 80–87, 89, 94, 97, 111
Lamp, Acetylene, 41, 52
limited animation 66, 80, 152–54. *See also* "full animation"
Lion King, 44, 155
Lost World, 23, 52, 204

MacArthur, Douglas, 30
Mā-chan no nikkichō (Mā-chan's Diary), 22
"Mad Machine" ("*Maddo mashin*"), xxii
manga no kamisama. *See* "God of Manga"
Manga shōnen, 22, 31–32, 44
Manga! Manga! xii

man-machine interface, 112
Marxism, 132, 134
Masaoka, Kenzō, 58
Matsumoto, Leiji, 49
Matsutani, Takayuki, xv, 3, 14
Mazinger Z, 112
McClaw, Police Chief. *See* Nakamura
McManus, George, 27, 44
mechatronics, xii, 99, 105
medical school, 23, 28, 59, 61–62, 99, 131
Meiji Seika, 6, 67
"Melanin Tribe" ("*Meranin ichizoku*"), xviii, ix, 123, 180
merchandising, 5–6, 13–14, 46, 74–75, 88, 96, 128, 150, 159, 168, 173
Metropolis (Fritz Lang), 107
Metropolis (Tezuka), 23, 73
Mickey Mouse, 27, 45, 46, 56, 57, 88
Mickey's Choo Choo, 57
"Midoro Swamp" ("*Midoro ga numa*"), xviii, xx, 74, 110, 178, 187
Mighty Atom: awards won by, 90, 152; as prophecy, 174; birth of, 3–11, 13, 15, 36, 52, 68, 117, 134, 158, 171, 185; champion of justice, 129, 152, 160; books about, viii, 117, 173; design of, 46–49; merchandising of, 14, 74, 128, 159; origin of name, 16–21; powers of, xvi, 12–13, 37, 40, 51, 102–4; technology in 102–6, 118; theme songs, 12, 14, 73, 88, 97, 102, 114, 120, 161
Mighty Atom, Space Hero. See *Tetsuwan Atomu: uchū no yūsha*
"Mighty Microbe Army" ("*Saikin butai*"), 93, 190
Mighty Mouse, 45, 47
Ministry of Science, 10, 13, 17, 21, 36–38, 68, 100–2
minorities, 47, 85–86, 123
Mishima, Yukio, 136
"Mission to Mars" ("*Kasei tanken*"), 70, 112, 177, 185
Mister Magoo, 67
Mitsubishi, 10
Miyazaki, Hayao, 134, 150, 154
Mom (Atom's mother), 38, 40, 48
Momotarō: Divine Sea Warriors (*Momotarō: umi no shinpei*), 58
Mori, Haruji, xv, 167
Moulin Rouge, 51
Murakami, Takashi, 172
Murata, Yasuji, 57
Mushi Productions: bankruptcy of, 94; films made by, 72–73, 94; formation of, 64–70; legacy of, 71–74
Mustachio (*Higeoyaji*, Shunsaku Ban, and Mr. Pompous), 39, 41, 52, 57, 82–83, 85, 125, 129
My Songoku! (*Boku no Songokū!*), 62–63, 79

Nagasaki, 19
Nagasaki, Takashi, 172
Nakamura, Inspector, 39, 41
Nakano, Eiji, 117
Nakano, Haruyuki, 50–51
Nakayama, Hiroko, 13–14
Nara Medical College, 61
NBC, 5, 76–81, 83–88, 92–94, 97
New Mighty Atom (*New Astro Boy*, or *ShinTetsuwan Atomu*) 1980 anime series, 156, 162
New Treasure Island (*Shintakarajima*), 23. *See also* Sakai, Shichima
NextWorld, 23, 204
Niiza City, 13
Nippon Television Network (NTV), 156
Norakuro, 24, 32, 57, 74
Now Comics, 96
nuclear power, 40, 81, 115, 130–31

Occupation of Japan, 22, 29, 32, 33, 47, 133
Ochanomizu Elementary School, 40, 125
Ochanomizu, Professor, 37–38, 40, 69, 82, 103–4, 117, 121, 129, 146–47, 157–58
Odaiba, 13
Olympics, 84, 120, 190
Ōme, Tamao, 39–40
Osamu Tezuka Culture Award, 172
osamushi, 25
Ōshiro, Noboru, 24, 44

Pathé Baby (camera), 57
Patten, Fred, xv, 161
Peli, 109
Perfect Search exhibit, 4
Phoenix (*Hi no tori*), x, xii, 123, 142, 155, 162, 167, 173, 191
Pinocchio, 4, 44, 47, 50, 52, 80–81, 89, 107, 109, 129
Pinocchio in Outer Space, 81
Pluto, 170–71
Pompous, Mr. *See* Mustachio
Popeye, 58, 86
Portopia Exposition, 163
Princess Knight (*Ribon no kishi*), 51, 60
prophesies, 174
PTA, 139–40
Putchā in Wonderland (*Fushigi na kuni no Putchā*), 109

QRIO robots, 116

R.U.R., 106
racial issues, 84, 124–28
"Red Cat" ("*Akai neko*"), 142–44, 177, 187
Red Shirt Brigades, 17
religions and religious issues, 85, 141–42, 187
Ribon no kishi. See *Princess Knight*
Rin, Tarō, 73
Robodex 2003, 7–13
Robot Hall of Fame, 115
"Robot Kingdom," xii, 7, 98
Robotania, 121
Robotech, 82
robotics: Asimov's Three Laws of, 107; research into, 6–9, 15, 107, 115–18; Tezuka's twelve laws of, 107–8
robots: androids (see "androids"); driveable, 112; giant warrior, 112–113; golems (see "golems"); transforming, 112–13
Rockwell, Don, 81, 88, 95
Russian literature, 25, 132

Saboten-kun (Cactus Kid), 22
"Saikin butai." See "Mighty Microbe Army"
Saiyūki (*Journey to the West*).

See *Alakazam the Great* and *Boku no Songokū!*
Sakai, Shichima, 23
Sakamoto, Masaki, 109
Sakamoto, Yusaku, xv, 64, 68, 73
Sankei newspaper, 34, 42, 75, 90, 124–25, 133, 135–36, 147–48, 177, 182
Sarumane, Professor, 101
Schmidt, William "Bill," 79, 81
Schulz, Charles, 46
science and technology, 15, 99, 114–17, 128–29, 131, 152
SDR 4XII, 12
Segawa, Masato, 61
Seo, Mitsuyo, 58
sex and sexuality, viii, 51, 137, 139
Shibugaki, 39, 41
Shikishima, Ken'ichi. *See* Ken'ichi
"*Shijō saidai no robotto.*" *See* "Greatest Robot on Earth, The"
Shimada, Keizō, 24, 32
Shimizu, Mari, 69, 158
Shinjuku, 13–14, 156
Shintakarajima. See *New Treasure Island*
Shinto religion, 86, 141
Shirato, Sanpei, 134
shōjo manga (girls' comics), 51, 60
Shōnen monthly magazine, 16–22, 33–34, 60, 110, 124, 145, 147–48
Shōri no hi made (Until the Day of Victory), 27
Skunk Kusai, 41, 130
Snow White and the Seven Dwarfs, 59, 64
software, 105–6
Sony Pictures, 4, 6, 35, 168–69
Specs. *See* Ōme, Tamao
Spider, 53
Spielberg, Steven, 168
Steacy, Ken, 96
Steamboat Willie, 56
Story of a Certain Street Corner, 64, 67
"story manga," xi, 44, 46, 60
Studio Zero, 74
Superman, 22, 45, 47, 149
Suzuki, Shin'ichi, 74
Tagawa, Suihō, 24, 32, 44, 74, 109
Takai, Tatsuo, 69, 73, 81, 88, 95, 158
Takarazuka city and theater, 22, 24–26, 48–52, 143
Takashimaya department store, 4
Tamao. *See* Ōme, Tamao.
Tameshigiri (Blade Testing), 32
Tanikawa, Shuntarō, 73, 82
Tanku Tankurō, 109
Tarzan, 23, 32
Tawashi, Inspector (Detective Inspector Gumshoe), 39, 41, 83
Tenma, Dr., 10–11, 17, 21, 36–38, 68, 77, 102, 117, 157, 183
Tenma, Tobio, 17, 36, 38, 68, 77, 82, 102, 158
Terry, Paul, 45
"Test Pilot," xvii
Tetsujin 28 gō ("Iron Man No. 28" or *Gigantor*), 110–11
Tetsuwan Atomu (meaning of), xiv, 21, 38
Tetsuwan Atomu Fan Club magazine, 34
Tetsuwan Atomu: uchū no yūsha (Mighty Atom, Space Hero), 72
Tezuka Productions, 3–4, 6, 13–14, 47, 95–97, 156, 159, 167–68, 171
Tezuka, Etsuko, 61, 148, 166, 171–72
Tezuka, Macoto, 11–13, 61
Tezuka, Minako, 52
Tezuka, Osamu: antiwar ideology, 140, 144; birth of, 24; commemorative stamps of, xi, 117; death of, vii, x, xii, 14, 35, 95, 128, 154–55, 163, 169–70; dissertation of , 61–62; love of drawing, 25; love of insects, 25–26, 136; love of music, 25; origin of pen name, 25; political beliefs, 132–36; productivity, 16; Russian literature, 25; translation of, x, viii, xii–xiv, 204; upbringing, 24–29
Tobio. *See* Tenma, Tobio
Tōei Dōga, 62–64, 66, 79, 159
Tokyo shimbun (newspaper), 43, 120
Tokyo TV (TBS), 61
Tomino, Yoshiyuki, xv, 73, 112, 151
Toyonaka City, 24
Toyota Prius, 3
"Tragedy of Bailey" ("*Beirī no sangeki*"), 123–25
Transformers, 112
translation, x, viii, xii–xiv, 15, 18, 21, 38, 79, 102, 106, 173, 204
TRON, 169
Tsunoda, Jirō, 74
Turing Test, 105, 118
Twentieth Century Fox, 92–93

United Nations, 133
Unno, Jūza, 24, 106
Until the Day of Victory. See *Shōri no hi made*
UPA (United Productions of America), 67
Uran (Astro Girl), 39–40, 179, 181, 187
Urasawa, Naoki, 170–72

Variety magazine, 87
VCRs, xi, 139
Vietnam, 43, 120, 133–35, 183
Voyage to Mars (*Kasei tanken*), 24

Wakuchia, Professor, 101
Wellner, E., 93
Westworld, 43
World War II, 19, 22, 26, 58, 61, 90, 98, 120, 155
World's Fair (New York, 1964), 90, 93
Yamamoto, Eiichi, xv, 64, 66–67, 71, 73, 75, 86
Yanobe, Kenji, 172
"Yellow Horse" ("*Kiiroi uma*"), xix, 43, 85, 106, 178, 187
Yokohama, 7
Yokoi, Fukujirō, 109
Yokoyama, Mitsuteru, 109–11
Yokoyama, Ryūichi, 27, 44

ZONE, 12
"*ZZZ Sōtō.*" *See* "Führer ZZZ"

STONE BRIDGE PRESS

Other books by Frederik L. Schodt published by Stone Bridge Press

All titles available in bookstores worldwide and online.

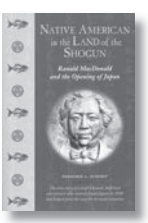
FREDERIK L. SCHODT is a writer, translator, and conference interpreter who lives in the San Francisco Bay Area. He has written extensively about Japan and Japanese culture, and his first two books, *Manga! Manga! The World of Japanese Comics* and *Inside the Robot Kingdom: Japan, Mechatronics, and the Coming Robotopia*, are now considered classics. He is frequently interviewed by media in Japan and the U.S. and has developed a reputation as a thoughtful and articulate advocate of using popular culture as a key to mutual understanding.

Mobile Suit Gundam

Awakening, Escalation, Confrontation

YOSHIYUKI TOMINO; TRANS. FREDERIK L. SCHODT; INTRODUCTION BY MARK SIMMONS

Japan's Gundam franchise that began in 1979 now boasts a worldwide cult of devotees. This novelization presents creator Tomino's unvarnished version, with rich characterizations and a shocking ending. 480 pp, 6 x 9", paper, 24 b/w illustrations, ISBN 978-1-880656-86-0, $14.95.



Native American in the Land of the Shogun

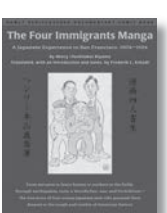
Ranald MacDonald and the Opening of Japan

How Japan, after 250 years of self-imposed isolation, began the process of modernization is in part the story of Ranald MacDonald. In 1848 this half-Scot, half-Chinook adventurer from the Pacific Northwest landed on an island off Hokkaido. Imprisoned, he became one of Japan's first teachers of English. 432 pp, 6 x 9", 60 b/w photos, maps, ISBN 978-1-880656-77-8, $19.95 paper; ISBN 978-1-880656-78-5, $39.95 case.

Dreamland Japan

Writings on Modern Manga

A collection of thoughtful essays on the current state of the manga universe, essential reading for fans, literati, and anyone interested in the shape of visual culture to come. Covers artists, magazines, and the fan scene. "The most encompassing and the best introduction to manga I have ever read."—Will Eisner. 360 pp, 6 x 9", paper, 8 pp in color, 100+ b/w illustrations, ISBN 978-1-880656-23-5, $19.95.

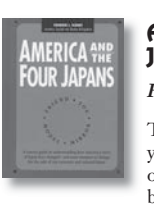


The Four Immigrants Manga

A Japanese Experience in San Francisco, 1904–1922

HENRY KIYAMA; TRANS. FREDERIK L. SCHODT

First published in Japanese in San Francisco in 1931, this is the author's chronicle of his immigrant experiences in the United States. A revealing description of early Asian-American struggles, and a document of great historical and cultural interest. 152 pp, 7 x 9", paper, ISBN 978-1-880656-33-4, $14.95.



America and the Four Japans

Friend, Foe, Model, Mirror

This readable, wide-ranging analysis brings you quickly up to speed on the ever-changing relationship between Japan and the United States. Drawing on history, cultural commentary, and opinion, the author portrays two nations in conflict yet increasingly connected. "Richly detailed. . . . speaks with refreshing bicultural sensitivity and balance."—*San Francisco Chronicle*. 200 pp, 5½ x 7¼", paper, ISBN 978-1-880656-10-5, $10.95.